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ABSTRACT

The Urban Systemic Initiatives (USI) program is an effort sponsored by the National Science Foundation (NSF) that targets large urban school systems with the goal of sustainable implementation of high-quality, standards-based teaching for the purpose of attaining system-wide increases in students' learning of challenging mathematics and science. The Milwaukee Public Schools joined USI in 1996 with the Milwaukee Urban Systemic Initiative (MUSI). Central to the design of MUSI was the establishment of a cadre of Mathematics/Science Resource Teachers (MSRT) to mobilize the school community to embrace high expectations for all students in mathematics and science and to develop effective teaching and learning strategies to achieve the goals of MUSI. The purpose of this report is to contribute data to the formative evaluation of MUSI concerning its first year of implementation. It consists of summaries, compilations, and reflections upon the activities engaged in by MSRT during the 1996-97 school year. Appendices contain a list of the First Wave MUSI school and First Cohort of Mathematics/Science Resource Teachers. (ASK)

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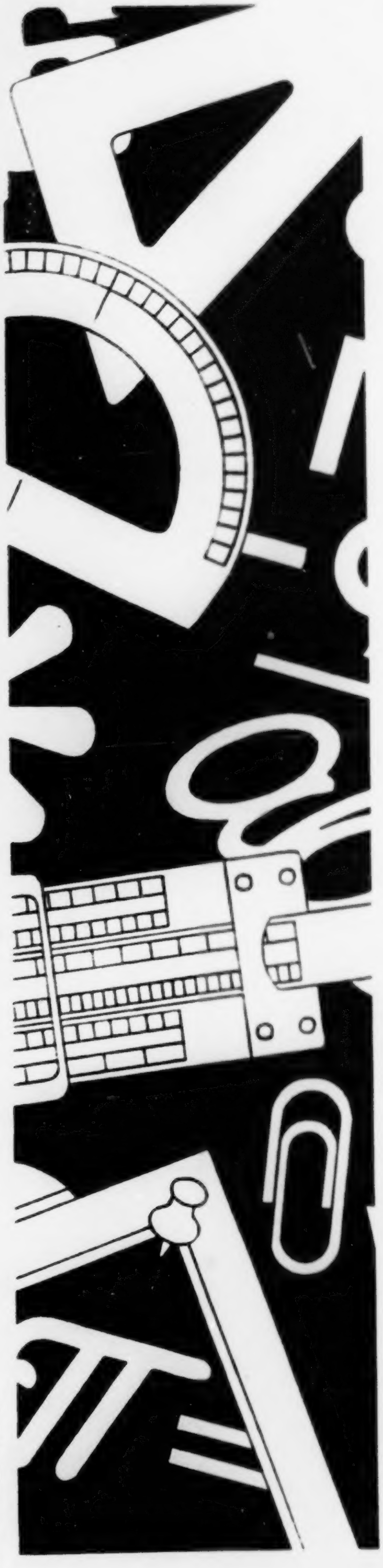

The Journey Begins

First Year Activities of the MUSI Mathematics/Science Resource Teachers

A Report on the
Milwaukee Urban Systemic Initiative

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October 1997

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CHAPTER 1

BACKGROUND

> *"We have a long journey, but I see many opportunities for teachers to grow in science and mathematics through professional development opportunities and with my support in the classroom."*
>
> *---an MSRT*

The purpose of this report is to contribute data to the formative evaluation of the Milwaukee Urban Systemic Initiative concerning its first year of implementation. It consists of summaries, compilations, and reflections of the activities engaged in by the Mathematics/Science Resource Teachers during the 1996–97 school year.

MILWAUKEE URBAN SYSTEMIC INITIATIVE

The Milwaukee Public Schools (MPS) began an expedition of systemic reform by joining in a cooperative agreement with the National Science Foundation in 1996 to conduct the Milwaukee Urban Systemic Initiative (MUSI). By September 1996, fifty-two schools had been selected as the First Wave MUSI schools and began a voyage of systemic reform in mathematics and science. Additional schools will be brought into this reform effort over a four year period.

The goals of MUSI include:

- Establishing ongoing collaborative vision setting
- Instituting high standards and performance assessments;
- Narrowing ethnic, gender, and socioeconomic achievement gaps;
- Developing high-content, inquiry-based, technology-rich curriculum and instruction;
- Breaking boundaries between classroom and the broader community.

Central to the design of MUSI was the establishment of a cadre of Mathematics/Science Resource Teachers (MSRT). Each MSRT, in general, was assigned to work with the staff at two MUSI schools. The MSRTs served as teacher leaders who mobilized the school community to embrace high expectations for all students in mathematics and science and develop effective teaching and learning to achieve those high goals. They also served as links to the larger district-wide initiative. Every aspect of the MSRTs work was designed to build capacity for change at the classroom level, the school level, and the district level.

The major duties and responsibilities of the MSRT included:

- Support effective learning in their school communities through a variety of collaborative techniques, including peer coaching, team teaching, demonstrations, and facilitating small- and large-group meetings and workshops.

- Provide school-based leadership in forming a vision of mathematics and science learning which embraces high expectations, standards-based instruction, and commitment to principles of equity among the members of the school community.
- Foster the use of technology, authentic assessments, and community resources in mathematics and science.
- Provide access to current literature, learning activities, and other science and mathematics related resources to members of their school communities.
- Learn through independent study, seminars, study groups, networks, courses, and conferences.
- Promote interconnections among teachers, students, and other community members district-wide around topics related to mathematics, science, and technology.

Twenty-five MSRTs were selected to work with the First Wave schools to facilitate and guide the journey. Most were assigned to work with two schools. Two MSRTs worked with three schools each. The listing of MSRTs and First Wave schools is located in the Appendix.

The MSRTs participated in a training institute from 28 August 1996 to 30 September 1996, after which they began working in their schools and on district-efforts. The MSRTs continued to meet approximately once a weekly for a full-day to continue their development, to identify concerns, and to develop strategies.

METHODOLOGY

The establishment of the cadre of Mathematics/Science Resource Teachers (MSRT) in the Milwaukee Public Schools was a new venture. This position had not previously existed in the district. The question arose, "How will these Mathematics/Science Resource Teachers support the classroom, school, and district communities of learners through systemic reform in mathematics and science?"

To examine the journey of the MSRTs, patterns of similarities and differences across the entire cadre was sought. To accomplish this, a design emerged which utilized qualitative data. The MSRTs were asked to submit reports every three months describing their activities, within and beyond their appointed schools. They submitted examples of these activities which provided a close look at how they facilitated the progress of the first wave schools toward realization of the MUSI goals.

For each report, MSRTs answered several open-ended questions and to provide rich examples of what was happening in their schools as well as their involvement in MUSI throughout the district. The questions posed for each report are listed in Table 1. As these answers and examples were compiled, patterns emerged as to how the MSRTs were able to not only meet their responsibilities but also:

- build trust and acceptance with school staffs;
- identify areas of mathematics and science that were most in need of improvement;
- identify what kinds of MSRT assistance was most successful as well as what did not work well, and
- provide evidence of schools beginning to progress toward more high-content, inquiry-based, technology-rich science and mathematics instruction.

Along with responses to questions, the MSRTs submitted copies of daily logs or copies of their calendars in what ever format that they were using. Twenty-two out of the twenty-five MSRTs submitted the initial report. Seventeen submitted the second report. Sixteen submitted the final report.

Summarizing data from the reports involved several stages. All reports were read to gain familiarity with the specific activities of the MSRTs. Next, similar questions from each of the three reports were combined in order to show the steady progression of the journey. Data were then re-read several times for recurring themes in response to each question area. The responses were then sorted and categorized by emergent themes. Finally, a summary was prepared for each area.

The summaries and themes for each area are described and summarized in the remainder of this report. For each theme, illustrative MSRT responses are included. Some of the responses were edited slightly to remove references to specific individuals and to clarify the intent of the responses.

Table 1. MSRT Report Questions

First Report (October–December 1996)

1. Characterize mathematics and science instruction in your schools. What are some of the strengths that you have observed? What are some areas that need targeted improvement?
2. What activities and tasks have you been involved with that have enhanced the classroom community of learners? Provide a general description and share some specific rich examples.
3. What activities and tasks have you been involved with that have enhanced the school community of learners? Provide a general description and share some specific rich examples.
4. What activities and tasks have you been involved with that have enhanced the district community of learners?
5. Describe any of your other activities from the past two months that you feel would be important to document.

Second Report (January–February 1997)

1. What strategies are you using to gain entry to teachers as an initial point of contact? What works for you?
2. What new activities and tasks have you been involved with that have enhanced the classroom community of learners? Provide a general description and share some specific rich examples.
3. What new activities and tasks have you been involved with that have enhanced the school community of learners? Provide a general description and share some specific rich examples.
4. What new activities and tasks have you been involved with that have enhanced the district community of learners?
5. Describe any of your other activities from the past two months that you feel would be important to document.

Third Report (March–June 1997)

1. What new activities and tasks have you been involved with that have enhanced the school community of learners? Provide a general description and share some specific rich examples.
2. Write a few paragraphs about how you have helped one of your schools make progress in improving math and science teaching and learning.
3. Choose a couple of teachers you feel you have impacted this year and describe how you helped them to change - even if the change can only be measured in baby steps. e.g., What were some approaches you used to gain their confidence? What types of encouragement were you able to offer? What did these teachers do differently because of your influence?
4. Describe any of your other activities from the past two months that you feel would be important to document.

CHAPTER 2

SCIENCE AND MATHEMATICS INSTRUCTION

The Mathematics/Science Resource Teachers (MSRT) were asked to characterize mathematics and science instruction in their schools as observed approximately during the third and fourth months of the school year. They identified both strengths and areas that needed targeted improvement.

The MSRTs discussed a variety of strengths in mathematics and science instruction within their individual schools. These ranged from teachers deeply caring about the students they teach to the availability within some schools of excellent resources and materials. The strengths most often mentioned were:

- evidence of standards-based and inquiry-based instruction in some classes;
- the use of manipulatives in some classes,
- innovative instructional methods;
- the use of elementary science kits;
- the presence of strong,
- exemplary teachers;
- student work prominently displayed;
- a strong elementary science or math specialist in the building;
- teachers involved in math/science committees and initiatives within the district;
- supportive administrators; and
- teachers who are willing to learn, share, ask for help, and change.

MSRTs also observed many areas within their buildings that needed improvement in mathematics and science instruction. One of the most targeted concerns was the lack of science taught in those elementary classrooms where a science specialist was on staff. Only two MSRTs reported that good science instruction was taking place in the classrooms as well as in the science lab by a science specialist. Other MSRTs felt that, while science specialists were providing excellent science lessons, many students had very limited science experiences because they saw the designated science teacher infrequently and there was no science taught in their classrooms. Another area that was identified as needing attention was basic understanding of the new local and state assessments, particularly in science, and strategies and resources to assist the teachers as well as the students in preparing for these assessments.

Other targeted areas of concern included: traditional, textbook driven mathematics; emphasis on rote memorization of basic mathematics facts; worksheets and repetitive drill; the need for more collaboration and support among staff members; under-utilization or no use of elementary science kits; disjointed and uncoordinated mathematics instruction and curriculum within a building; lack of science equipment in the building; lack of rich, contextual activities in both science and mathematics; lack of cooperative grouping, lack of alternative assessments; supportive technology either not used, misused, or not available; and time for teachers to meet and talk about science and mathematics.

SCHOOL STRENGTHS

Many school strengths were identified. The following is a list of illustrative responses from the MSRT reports that highlight identified school strengths.

- In both schools the greatest strength that I can describe is the willingness of the teachers to learn new strategies that will help improve student achievement.
- One school departmentalizes for math and science. The science teacher is very comfortable in teaching process and content. He uses the science kits to support his curriculum.
- Both schools are very involved in the district initiative called Project Science. They have also used Eisenhower funds to attend after school staff development on Performance Assessment.
- Student work is prominent in the environment and the work reflects connections to the NCTM Standards. Classrooms are organized so that manipulatives are accessible to students.
- The Title I resource room has a wealth of teacher resources and a variety of manipulatives.
- The kindergarten and first grade teachers utilize the MPS science kits in their classrooms. They have an integrated approach and science is visible in the environment (animals, plants, magnets, centers with activities).
- The science program is led by the science resource teacher who goes into the classroom to provide instruction. She uses the science kits provided by MPS and a variety of their resources. The science resource storage room has a variety of teacher materials and equipment. Many teachers also use the kits. Teachers remain in the classroom during science and assist the resource teacher. In many classrooms there are bulletin boards which provide evidence of science instruction. Students' experiments along with written explanations are visible. The rooms are also characterized by animals, science tables/centers and so on.
- There is a math storage room with a wealth of manipulates and resources.
- At one school, strong content is occurring in the first grades. I believe that this happens because of one very strong teacher who has taken on a mentor role with novice teachers.
- Math in the primary grades is strong. A focus teacher teaches math to the first grades and two out of three second grades. The focus teacher is well versed in math and is currently enrolled in the PBS Mathline.
- Math and science are taught every day in every classroom at this school. Some teachers use the MPS kits, but the school has a wealth of supplies and resources. I see as part of my role the task of acquainting some of the staff with these resources. Although this school has a full time Science Resource teacher, its strength is in mathematics. The primary grades use Math Their Way, CGI and a lot of Marilyn Burns materials. At each grade level, there is a strong teacher who can serve as a model to the others.
- A plus is that the reading teachers are incorporating math and reading together. Next they will try incorporating science with the reading.
- My schools both show strong displays of children's work in the classrooms and halls. I have seen principal support for hands on science in both buildings. One school has an ideal teacher resource room that I would like to use as a district model, in both philosophy and content.

- One school has a school-wide science theme and does a lot of extensions within the classrooms. They use some of the materials and activities from the science program developed with the MPS science team. This is including the use of kits and resources from the chosen MPS program. Materials are not a problem in either school. Both are well equipped and both are willing to put forth efforts to improve math. One school wants to offer more staff development around both science and math.
- The science lab has some good equipment and gives all students a chance to use the scientific method in a lab setting. The teachers care for and like the students. Some math teachers are trying to pilot Mathematics in Context - this requires a lot of work and preparation time.
- Teachers have access to a great variety of materials. The original manipulatives from MPS are still in use in around half the rooms. A computer lab dedicated to math classes is set up to be used as a tool to enhance classroom instruction. Assistance of outside funding helps a lot. It gives teachers a chance to work and plan together, and allows them to work toward giving all students at the same grade level similar experiences.
- The primary school teachers have learning centers in their classrooms. Many use the science kits.
- The middle school is piloting CMP (Connected Mathematics Project) and working hard to implement it. Two out of the five math teachers are involved in the MPS Algebra Network. Two others are taking the UWM/MUSI Algebra course.
- There is an awareness and concern about materials, content, and strategies being appropriate for students. Most teachers have some appreciation for the NCTM Standards.
- There is an attempt to develop a sense of sharing. The teachers are more at ease in sharing their successes and failures.
- Many of the teachers in both schools have the students work in cooperative groups, ask meaningful questions, and reflect on the learning that has taken place. The majority of teachers are willing to ask for help and willing to accept ideas that are offered to make their teaching successful.
- At one school the adopted science curriculum is the BSCS series. I have observed a number of classes and I am very impressed with what I have seen. The students were always engaged in some investigation, actively trying to understand some facet of science. The students were usually working in groups with a partial focus on a social skill of the day. In one science class, a teacher who is actively involved in ecological organizations has taken her students to Lulu Lake and other places to begin to look at taking care of the environment. She also brought a guest speaker in to talk about frogs and other amphibians and show off live specimens The science teachers are putting together a pre- and post- test so they can measure progress through the year. It will be performance based and given to all students.
- At one school, there is a huge push to have teachers develop curriculum across the disciplines. There is a lot of money available to teachers who want to work together to develop some cross-curricular units.
- Five or six teachers are using Algebra Gear to help students understand the concepts of Algebra. There are a number of teachers who give their students fewer but more challenging problems. I know of a first year teacher who is going to have her students plan how to start a business. She has yet to work out all the details, but it is a very ambitious idea.

- There are outstanding examples of cooperative learning and the use of manipulatives and graphing calculators in several mathematics teachers' classes. One teacher finds that the use of computers in the Lifetime Math algebra program really engages the students that have the most deficiency in skills.

TARGETED AREAS FOR IMPROVEMENT

Even though many school strengths were identify, there were also many areas recognized that were in need of improvement. The following is a list of illustrative responses from the MSRT reports that highlight areas for targeted improvement.

- There is a science lab in this school with a qualified science teacher who is eager to grow and learn new ideas. This teacher is willing to try new things and teaches with a hands-on approach. K5 through sixth grade students participate in the lab three times a week for five weeks at a time while early childhood and exceptional education classes participate in the lab once a week. Time blocks are in forty-five minute sections. Unfortunately, most teachers do not do science in the classroom during the weeks that the students are not in the lab.
- Science instruction exists only in the science lab provided by the science resource teacher for grades 2 to 5. They have a rotating schedule for every two weeks. The resource teacher uses the kits provided by MPS. Further exploration beyond the kits has not been evidenced. The teachers don't remain in the lab or extend activities.
- The science teacher pulls out students from the classrooms and works with them in the small lab on a regularly-scheduled basis. I was told that only about five of the teachers at this school regularly teach science in the classroom. The others leave the teaching of science to the science teacher.
- The teaching of science at one of my schools is left fundamentally to the "science specialist," with the exception of the kindergarten classes which are departmentalized. Science and math are both components of this kindergarten program.
- The intermediate grades have some teachers using the science kits and other leave everything to the science resource teacher in the one hour per week session. I see a need for more coordination between the resource teacher and the classroom teacher.
- Math instruction appears to be centered around the textbook. High emphasis is placed on memorization of math facts.
- Math instruction at grades 2 through 5 that I have observed is very traditional with pencil and paper activities, procedures, lectures, and drill of basic facts.
- In one of my schools, a multi-thousand dollar science order remained packed away, untouched, in shipping boxes in a closet.
- Math varies from doing occasional real-life practical application problems to doing a lot of repetitive drill. Students complain about doing 20 or 30 problems, but many like the comfort of sitting down and doing them. Doing a page of math is mildly challenging, is finite, and is traditional. Students are happy with assignments like, "Do page 222, 1–30." Students do not have to think and they know when they are done. When given a page of math drill to do, the students feel they are getting an education.
- The lessons are highly structured and teacher directed with one child answering a "fill in the missing fact" type of question.
- Some classrooms are using CGI at various stages of implementation while others are using traditional teaching strategies. Some teachers actively use manipulatives in their

classrooms. This is usually the case in the lower grades. In the upper grades the text is used almost exclusively in instruction.

- Much technology has been installed, but lacks a clear purpose at this time.
- There is little or no school equipment in the building. The staff seems to be interested in increasing science instruction but is uncomfortable with the hands-on approach.
- I see little evidence in the primary grades of hands-on science.
- Math in grades 3 through 5 varies from classroom to classroom, but generally, the teachers follow the textbook and occasionally supplement with other activities.
- The biggest problem is not understanding how to connect the science resource book and the science materials. Some teachers also do not know how to extract the science content in the units from the teacher's manual or what content to teach.
- Both schools need to have a better awareness of how science is taught and how to integrate hands-on with the content. One school is in desperate need of supplies and materials. Materials, supplies, and paper need to be readily on hand when needed.
- Both schools have equipment and other materials that could help them get started, but the majority of teachers do not have a scheduled time for science.
- Newer technology is needed in the math computer lab. Presently the math lab is used for drill. It needs problem solving software. Teachers need to learn about constructivist approaches to learning, as well as more emphasis on mental math and estimation, rather than only computation. In science, there are often too many "booky" kinds of things.
- Some teachers feel pressured to teach only basic facts in math and to spend most of the day teaching reading.
- Math at one grade level is strictly taught through the use of a textbook/worksheet method. It is not taught as inquiry-based, nor connected to the students' real world. Areas of improvement would be collaboration, cooperative learning, the use of manipulatives, and the Standards.
- At this school there is still teacher skepticism toward such innovations as cooperative learning models and broad based curricular reform. The skepticism needs to be overcome so that the level of commitment toward and enthusiasm for the concept of efficacy that all students are capable of learning, will advance.
- Some of the teachers are overwhelmed with paper work, classroom management, stress, lack of planning time, and are unsure of the content to be taught. Of course, within the schools there are a couple of teachers that think group activities are too much work, the classroom gets too loud, and think that the entire year's content will not be covered.
- There are some teachers who seem to teach in a very rote and unstimulating way. One teacher was teaching how to solve equations like "x + 5 = 13". No context was given to the situation. The students were just asked to solve for x.
- A number of mathematics teachers continue to use the lecture method. Their desks are in rows and they do not use cooperative learning. They do not use manipulatives or calculators.

CHAPTER 3

SCHOOL AND CLASSROOM COMMUNITIES OF LEARNERS

Throughout their journey during the first year of the initiative, the Mathematics/Science Resource Teachers (MSRT) devoted most of their time to enhancing the school and classroom communities of learners. For each reporting period, they described activities and tasks in which they had been involved that enhanced the school community of learners. For the first and second reports, they also described activities that enhanced the classroom community of learners. All of these responses were combined and then analyzed for patterns of similarities and differences across the entire cadre of MSRTs.

Five major categories were identified from the responses. They included (1) professional development, (2) curriculum and assessment, (3) classroom teaching and support, (4) resources, and (5) partnerships for learning. Several themes emerged within each category. The themes for each category are listed in Table 2. These categories and themes represent activities reported and discussed by many or most of the MSRTs.

The majority of the MSRT activities focused on the professional development of teachers, administrators, and other staff members. The models of professional development varied to meet the needs of specific school learning communities, as well as to meet the needs of individual teachers. The MSRTs conducted or planned formal staff inservices within their schools, as well as across schools. Sometimes they teamed up with each other to offer an inservice to the staffs from several schools. Many MSRTs were also able to engage teachers in professional discussions around science and mathematics learning through established grade level or department meetings or by participating in other established school committees. At a more informal level, MSRTs would conference and meet with individual teachers or small groups of teachers to discuss science and mathematics. Another strategy that was used by many MSRTs was to participate alongside teachers in courses, meetings, workshops, and other events. This provided an opportunity to engage in focused discussions around science and mathematics and often lead to further interaction and work with individual and groups of teachers.

The MSRT activities focused on helping teachers, administrators, and other staff create a common vision of standards-based science and mathematics. They engaged staff in examining national standards in science and mathematics, the MPS mathematics and science curricula, and district and state assessments. They also raised issues of equity as it relates to science and mathematics learning.

Teachers can attend staff development sessions, but what really matters is what occurs within the context of classrooms and interactions of students. The MSRTs were able to provide one-on-one classroom-based support to teachers as they worked toward implementing standards-based science and mathematics. The MSRTs conducted demonstration lessons as well as team taught. These provided opportunities for teachers to observe their students engaged in inquiry and standards-based instruction. The MSRTs also served as another pair of eyes for conducting classroom observations or another pair of hands to help out during hands-on lessons. Some MSRTs also worked directly with students individually or in small groups on special projects or for specific tasks.

To implement inquiry-based, hands-on learning requires materials and equipment. Many MSRTs assisted in ensuring that teachers had the resources necessary to implement standards-based science and mathematics. For some it meant taking an inventory, organizing the materials and equipment within a building, and informing teachers on what was available. For others it involved identifying and ordering the needed resources. MSRTs also provided support for technology infusion into student learning and teacher professional development. Some teachers needed ideas and suggestions for implementing graphing calculators into their instruction, while others just needed assistance in getting online themselves or installing software.

The other area of MSRT activities involved developing partnerships with the broader community. This included creating strong links with families, businesses, and community agencies, as well as with other schools within the system.

Table 2. Activities to Support School and Classroom Communities of Learners

Professional Development

- Conducted formal staff inservice within and across schools.
- Meet with grade level groups, departments, and school committees.
- Facilitated development of a school action plan for mathematics and science and other focused initiatives.
- Assisted teachers with strategies to prepare students for state assessments and for district performance assessments and proficiencies.
- Conferred with individual and small groups of teachers—listening, offering suggestions, advice, and/or encouragement.
- Participated alongside teachers in university courses, meetings, workshops, and events—reflecting and discussing instructional practice.
- Assisted staff in writing grant proposals.
- Arranged for teachers to visit other teachers within the school or at other schools.

Curriculum, Assessment, and Equity

- Helped teachers understand the MPS mathematics and science curricula, national standards, science and mathematics connections, and integrated curriculum.
- Developed opportunities for teachers to better understand state and district mathematics and science assessments.
- Identified and discussed equity issues with school staff.
- Assisted teachers in developing and modifying units and activities for classroom use.
- Assisted with pilot projects.

Classroom Teaching and Support

- Team taught within classrooms.
- Conducted demonstration lessons and modeled techniques.
- Observed and supported teachers in the classroom and provided feedback.
- Worked with individual or groups of students.

Resources

- Assisted with technology—curricular infusion, getting teachers online, and technical support.
- Gathered and ordered materials and located resources.
- Located and inventoried equipment and materials.

Partnerships for Learning

- Linked staff between schools and brought other MSRTs and UWM faculty to the schools.
- Contacted business partners , informal education agencies, and other community agencies.
- Facilitated links with families, parent groups, and parent centers.
- Helped with school-wide mathematics and science events

PROFESSIONAL DEVELOPMENT

Every MSRT was involved with professional development of teachers, administrators, and other staff members in science and mathematics. Within the category of professional development, eight themes or patterns of activities emerged. These eight themes could be considered the key types of strategies used by the MSRTs for inviting teachers and staff to join the expedition of improving science and mathematics learning. These ranged from conducting formal staff inservices to conferring with individual teachers to attending activities alongside teachers. Each theme is listed below with illustrative examples from the MSRT reports.

Conducted formal staff inservice within and across schools.

- Another MSRT and I planned and provided an inservice in September on the new TERC Investigation math series. This inservice was offered on a Saturday morning and was attended by 17 members of one of my schools, including the principal, assistant principal and learning coordinator.
- On banking time day, I presented a one and a half hour lesson involving a hands-on science activity. It was attended voluntarily by ten staff members.
- At one of my schools I have placed more concentration on science, since they do not have a "Science Specialist". I have conducted a workshop for the staff with the hope of being invited into more classrooms. This is a teacher-by teacher endeavor, and I have worked specifically with the kindergarten, fifth and sixth grade teachers.
- I have facilitated/presented at Title 1 planning sessions about science process skills, content, assessment, equity.
- I did an after school inservice on fraction strips that all the teachers are using or have completed.
- I have resolved to find ways for helping teachers implement effective cooperative learning practices, beginning with a workshop on cooperative learning in January. The Learning Coordinator has expressed a need for such workshops for the entire staff. Embedded in this workshop, I will begin to also address the use of inquiry by teachers.
- Another MSRT and I collaborated in a presentation for teachers by Cal Irons, a consultant from Australia. It was attended by 70 MUSI teachers and received well. He provided specific activities built around the concept of estimation.
- On the banking day in February, I worked with the Assistant Principal on planning and carrying out a half day workshop focusing on math. We built in some accountability as a follow-up on the inservice. We focused on "incredible equations " and how they could be used, adapted, and expanded upon across the grade levels. We began with the question: "21 is the answer, what is the question?" We continued with sharing by staff as to how they used the activity. We proceeded to brainstorm ways to make this simple activity more relevant. We discussed how this could encourage algebraic thinking. Then each teacher had to write down how he/she would use this activity in the classroom.
- One school staff decided, after looking at the school plan, that is was important to revisit CGI (Cognitively Guided Instruction). The entire teaching staff will attend a two hour introduction/review of CGI in March. I wrote for and obtained a mini-grant from Eisenhower funds to pay the staff to attend. I will conduct the inservice myself since I do have some experience and training. I will incorporate recently obtained information on multiplication, division and place value.

Meet with grade level groups, departments, and school committees.

- In December, I invited all staff members to a sharing session to discuss any issues pertaining to math and science instruction. The session didn't cover a lot of ground, but participants expressed satisfaction from being listened to and being able to discuss issues with colleagues. At the close of the meeting I invited the attendees to be a part of a reform team that would focus on science and math. I explained to them that since I will only be at their school for a limited time, a nucleus of teachers would be needed to sustain the reform effort. The exact form and function of this team is still evolving. Fourteen staff members signed on and six are still active participants. Thus far we have focused on devising strategies to increase the amount of time spent on quality science instruction at all grade levels. We will start to develop the implementation process for each strategy during our next several meetings.
- In order to begin to develop a vision of science with the school, I asked to hold a meeting of the science committee. The committee originally was formed with three members last year, but the principal encouraged more people to join and now it consists of one representative from each grade level. The meeting was to find out where the school was in terms of science instruction and develop a vision of where it would go. A large focus was the new accountability measures in the area of science and how that impacted instruction.
- I have been included in the planning of staff inservice days and have been included in three days of grade level meetings focusing on math and science. I have been called upon to provide feedback, insight, and organization for the school's math and science program.
- I serve on the science and technology committees in both buildings.
- I have facilitated at grade level joint planning sessions in which I spoke to the teachers about science, planned dates to do science demonstration lessons, and gathered other resource materials that they requested.
- I try to attend a variety of meetings in the morning prior to the beginning of the student day, such as technology meetings and grade level and subject area meetings. These give me an opportunity to interact with staff members other than just the math and science teachers.
- I held a second set of grade level meetings in October where teachers received a specific checklist indicating what I could do for them personally. From this instrument I was able to provide activities to teachers in the topic areas they needed.
- A joint mathematics and science teacher meeting was held to discuss each department's needs and how the $12 000 in leveraged/cost-shared funds could best be used. Mathematics teachers stated that they desired more graphing calculators to allow this technology to be whenever appropriate. Science teachers are concerned about the new proficiency test and feel that they need to prioritize their needs before making a decision.
- I attended common planning meetings for each of the School to Work families.

Facilitated development of a school action plan for mathematics and science and other focused initiatives.

- The school is progressing in many ways. A math/science reform team was formed and has been responsible for designing staff development. The group has also developed an action plan to increase the amount of time being spent on quality science instruction. The key members of this group are committed to be the leaders of Math/Science at the school after I move on to my next assignment.

- At least one meeting has been planned for the week of March 17, and with funding from MUSI, a second meeting will be held to get the mathematics and science teachers together so that common issues/concerns may be found and explored. This will lead to an action plan that involves this MSRT and includes the input of all interested parties. Tentative questions to be posed to the group will be, "What components of the mathematics and science performance and proficiency assessments do the mathematics and science curricula have in common?" and "What are some ways that we can integrate our endeavors to prepare the students for these proficiencies?"
- At both schools I have set in place a focus group that will meet once every other week. The purpose of this group is to begin a dialogue to ultimately develop a "vision" or focus for the school in math and science. Both schools have isolated or small groups of teachers that have a plan as to what their students should know and be able to do. Many teacher's responses are "finish the book." My goal is to have the school develop a plan that communicates what the students should know and be able to do by grade level. This information would then be used to make decisions in curriculum planning, budget, and communication from one teacher to another to better meet the needs of all of their students especially those ethnic and gender groups that have the greatest need. This is a beginning step which I hope will continue into next year since I believe this undertaking will require considerable amount of effort and strategy to bring on board enough staff to make a measurable difference. I am beginning these meetings in March. Several staff at both schools have expressed interest and see a need for this school focus plan. A concern is the budget implications this focus might require for next year. I have made requests at both schools that funds be available for the groups to continue their work. The administrators at both schools are pleased and share the need for this initiative. They have ensured me that whatever needs the group identified they will be given a high priority.
- On Banking Time Day, I joined the School to Work committee and listened to their plans for the year. My first conversation with the Math/science teachers occurred at grade level meetings set up by the principal. I introduced myself and MUSI to each group and had teachers complete a form indicating how they thought an MSRT might help them improve academic achievement for students and lower the gap. From these meetings, a math and a science person from each grade level was selected to form a Core Committee to assist the MSRT in developing an action plan and focus. This committee has met two times so far.

Assisted teachers with strategies to prepare students for state assessments and for district performance assessments and proficiencies.

- The science performance assessment is a district accountability measure and has generated much dialogue. I am in the middle of this and encouraging the discussion; it is a good place to be. The principal at one school wanted some information on the reading level of the assessment, so I took the opportunity to create a student survey regarding the assessment. It is a five question survey which will provide some student feedback and some points of discussion as we analyze the assessment results and plan for the future.
- Along with two other MSRTs, an Eisenhower grant was written for six hours of inservice for fourth and fifth grade teachers on preparing students for the MPS Science Performance Assessment. All of my fourth and fifth grade teachers from both schools attended the sessions. We discussed what the assessment might look like, came to a group consensus of steps in the scientific process and their meaning, and offered suggestions on how to use the teacher's manual from the MPS science curriculum to develop lessons that focused on the scientific process.

- I developed a science performance booklet with several activities teachers could use with students to get them ready for the science performance assessment. I focused on mass and the scientific process. These were distributed to the sixth and seventh grade teachers.
- I actively recruited three science teachers from one school and four teachers from the other school to participate in Project Science (an MPS curriculum initiative) and feel that this is a break through because it will give us time to work together focusing on student achievement. Project Science will help teachers to prepare students to take performance assessments and help teachers to write and score performance assessments. The first day we (myself and teachers from the first school) participated in this Project was meaningful because we were able to have an extended and focused discussion on student learning.
- I provided the Equity 2000 math teacher with my copies of practice math proficiency items.
- I worked with two sixth grade teachers on preparing students for the middle school math proficiency exam. We gave the students a prompt and then the three of us met after school to score the prompts. We shared the results with the students and had them look at examples of student work and apply the rubric. I followed up with two other visits to share prompts, but this time the students worked in groups and discussed the prompts together to talk about strategies for solving the problems.
- I developed and provided parallel science assessment activities to help students and teachers to better understand the assessment process. I provided several weighing and mixing activities involving sand, salt, iron filings, and sugar to show the students and teachers how to weigh substances using the balance.
- In three of my schools I showed the teachers how to give the science assessments. I helped on assessment day by handing out chemicals, rulers, etc. In one of my schools, I was asked to give the assessment. The teachers and student teachers were able to watch how I gave the test to 100 middle school students with little help, without spilling the chemicals, and without losing my smile!
- At one school, I focused on students being able to develop a plan to implement an experiment. One of the classes had much more experience working with tools, while the other classes had major difficulties just measuring mass. Out of this activity came the idea that the school needed to discuss expectations and scientific language to be used uniformly throughout the building.
- I met with the MPS Title I Supervisor, two teachers, and the principal to discuss the ITBS. We examined the material and began to formulate a plan to implement this year. The Title I Supervisor was most helpful in both explaining the materials and making suggestions. A plan is in place, and will be assessed. The ITBS was then shared by all staff on Banking Time Day. Teachers took part of the assessment and had discussions as to what was needed on a school-wide basis for our students to succeed.
- For the past two months I have been involved in math and science assessments. The teachers as a result were encouraged to participate in the scoring of these assessments. I was able to get teachers from both of my buildings to score the science assessments. The sixth grade teachers have become involved in the middle school science curriculum group. They also are involved in the grounding and scoring of the middle school math proficiency tests.

Conferred with individual and small groups of teachers—listening, offering suggestions, advice, and encouragement.

- The math teacher has found out about and applied to become a WASDI math teacher. He has also promised to get out of his "comfortable little world" and get more involved in district-wide math activities. He also liked the idea of presenting in summer academies.
- I meet with the staff families and provide input as to how math and science might be used in the students' projects.
- I have been there for a teacher to express his concerns about teaching math and science and encourage him to continue to grow.
- I met with a sixth grade math teacher and discussed how to manage the class during an activity. The idea of following the math standards was instilled during her college days as well as during her experience as a student teacher. Also I have tried to keep her morale up when things weren't going will, being the encourager.
- One of the teachers is new to teaching math. We have bi-weekly meetings to discuss appropriate curriculum. There is on-going dialogue in strategies that would be most effective in teaching specific objectives. There are also overlapping talks on creating a better learning environment which has lead to pedagogy and classroom management strategies.
- I have worked with pre-assessment of students' needs with a teacher to enable him to feel more comfortable.
- I have facilitated discussion groups on cooperative learning and portfolios.
- I have begun to establish a procedure for working with teachers: Pre-conference, demonstrate, they teach, conference. There has been one major success that I will report. One teacher who publicly stated that she would not teach science, has begun the process. We met, analyzed the text, examined the kit, planned outcomes we thought the students would need. Then I demonstrated and she is now teaching science when I am not there. This has been a large success.

Participated alongside teachers in UWM/MUSI courses, meetings, workshops, and events—reflecting and discussing instructional practice.

- Both of my schools have participants in Project Science. One school was involved before I joined the faculty and the other school was admitted after conversations with Carmen Baxter, the MPS Science Specialist and the person in charge of the project. The immediate need expressed by them was, "How do we get what we are learning from Project Science to the rest of our peers in the school?" This told me many facts: (1) they are valuing what they are learning; (2) they see the staff as a community that needs to work together to raise student achievement; and (3) they are seeing this project as a vehicle to bring about school change and system change.
- I encouraged several fifth and sixth grade teachers into using World In Motion materials in their classrooms. All four of us attended an all day workshop at Discovery World where we connected with two engineers from Harley-Davidson. They will have a working relationship with the teachers and the children.
- One strategy that I have used to enhance the community of learners is to attend the UWM/MUSI elementary math course with the teachers from my schools. In doing this I am able to help them make connections to the standards, bridge gaps of understanding, team plan lessons, and model lessons that enhance what they are being exposed to in the course.

- One school has never had teachers take part in the Assessment Community of Teachers (ACT), now two teachers are participating at the regular meetings.
- Another bright spot is the UWM/MUSI algebra course, which I too will participate in, because, again, I will be able to interact with teachers around the focus of math curriculum and instruction.
- I went with two science teachers to the Jason Project training session at UWM. It was helpful in getting to know them better. The most difficult part of this job is finding time to talk uninterrupted or undistracted with teachers. Rightly, they need to attend to the needs of their students and position. Talking with them is a high priority for my job but not for theirs.
- When teachers attend workshops they are required to come back to school and demonstrate to other teachers in the family at least one activity that they learned that would raise student activity and achievement The teachers that went to the workshop were enthused and confident. This opened up a door for the teachers to ask for help and support within the school.
- I have been a member of a school team that went to a Saturday National Urban Alliance inservice. At that same school I have been a team member at a Saturday session devoted to the arts in math and science. I have offered to help staff members who are taking college statistics courses.
- After attending an abbreviated PUMP training with the teachers, I offered support for implementing the program to those interested. Time was spent planning how implementation would occur. Support included copying papers, entering class list data into the computers and teaming with teachers during lab time. This gave me a chance to model active listening techniques and management techniques. Even though only one of the three teachers who attended the inservice is using the curriculum, the others have not totally given up on the ideas of trying the material. I continue to offer assistance.
- Through distribution of flyers and personal contacts, math and science teachers are enrolled in the MUSI/UWM courses in algebra and the sciences. The offering of these courses provided me, as MSRT, with some perceived purpose; I had something to offer teachers that they wanted. It was wise to direct the applications through the MSRT even though teachers could have applied directly. I was able to make the personal contact and follow-ups necessary to insure their participation which facilitated communication between me and teachers and resulted in building a relationship around a non-threatening topic, thus trust building. In addition, this effort resulted in participation in courses which would have been overlooked by busy teachers who receive multiple flyers and notes in their mailboxes daily.
- An all day workshop on cooperative mathematics is to be held in Milwaukee in April. At my urging and facilitation, a first year math teacher will be able to attend this workshop with me. The two of us will collaborate to share what we learned with the rest of the school math and science staff.
- I have attended all but one of the MUSI/UWM algebra classes and have found it to be a good way to get to know some of the teachers from one of my schools. Having so many from this one school in the class made it easy to get teachers to want to try a CMP unit in their classes.
- I participated with the staff in the "Getting Parents On Your Side" in service with Lee Canter and Associates.
- I am facilitating portions of a UWM course. This course has encouraged teachers to take risks and move toward standards-based instruction. The existence of this course also helps enhance the development of the district community of learners. Participants

are being asked to incorporate standards-based instruction into their teaching, then reflect on their experiences with other teachers from throughout the district. Discussions centered around science assessment have been spirited and thought provoking. I think all the UWM courses are having a direct impact on what is going on inside classrooms.

- One teacher resisted teaching science until late in the spring. I kept encouraging her and facilitated her enrollment in a couple of science experiences, including the MUSI/UWM course for science. By the end of the year, she had begun to teach science activities, using equipment, and said that she was enjoying herself. She has the potential to become a very good teacher of science because she is a good teacher already. She just didn't know she could teach science even though I kept telling her this repeatedly.

Assisted staff in writing grant proposals.

- I am writing a grant for one of the eighth grade teams. We met and planned several days prior to my initial attempt at writing it. Then, as I wrote, I took it back to the teachers to critique, to change anything that did not say what was intended and to add any new ideas. We meet regularly during their prep time. I would make changes during other class periods. Since this was my first time doing this, it took longer than it would if I should do it again. The grant writing has given me more credibility with other teams as more teams would like to work on projects.
- We formed a committee to write an Eisenhower Grant proposal after doing a staff needs assessment. By having a committee write the grant proposals, we have all become familiar with the grant writing format. This community of learners developed confidence in doing an activity like this on their own.
- I have assisted in writing a $2000 grant that was accepted to inservice teachers in using technology in science fairs. I am assisting in writing two $50 000 technology grants.
- I was able to write two successful grant proposals which have received funds. The awarding of these grants has energized both school staffs and has facilitated their involvement in MUSI support activities.
- While the school did not receive the Toyota Grant, I was instrumental in the writing and UWM was most helpful in the process. Working with a portion of the staff seems to be helping my credibility and gives credence to my willingness to work hard and accomplish a task.
- I was successful in getting a Goals 2000 grant to buy $10 000 worth of very hands on and student friendly physics equipment for one of my schools. Many teachers at one of my schools have been involved in a project called the National Urban Alliance (NUA). It has centered on hands-on physics equipment developed by Tom Hsu and associates at the Cambridge Physics Outlet. I am an NUA member at the school and have gone to three or four workshops this year. The equipment should arrive just after Spring break and I have arranged for Tom Hsu to come to do a day long workshop on a Saturday later in April. It is very satisfying to be a part of this and to see teachers get excited about using this equipment with their students.
- I am very excited about writing and receiving a Goals 2000 grant for one of my schools. The $10 000 grant is to equip the classrooms to do hands-on science. It includes buying supplies and resources and providing training for the teachers. This grant has become a catalyst for establishing a science room for the entire school. In essence, there will be two fully equipped science rooms. A proposal for the establishment of a school wide lab had gone to the staff in March. It came jointly from the group that was working on the Goals 2000 plan and the school's technology committee. While the school was considering hiring a full time science person, I made

what I believe was a strong statement that this in no way should absolve teachers from teaching science every day. This needs to be very clear from the start and both the principal and the committee seemed to agree. The grant writing was a way to get the staff thinking and talking about science.

- I have been writing a grant for the technology time line for one school. I developed the time line and wrote a $93 000 proposal to support the time line to bring the school into the technology age. The grant was weak in community support which is what I am now focusing on—to find community support for the program and school.

Arranged for teachers to visit other teachers within the school or at other schools.

- The one main task I took on to enhance the school community of learners was to increase the sharing of successes within the school by having teachers demonstrate to other teachers.
- I participated with the staff from one of my schools when they went to see technology in another school to get an idea of where their school needs to go.
- I have covered a teacher's class so she could work with a first year teacher.
- I taught the classes of two first year mathematics teachers while they visited the classroom of a master teacher in another school. They gleaned many ideas about pedagogy, class management, cooperative learning, assessment, etc., from the observations and discussions that occurred.

CURRICULUM, ASSESSMENT, AND EQUITY

Essential to a successful journey in systemic reform is knowing where you are going—having a common vision of the science and mathematics curriculum. Also essential to an expedition is being able to determine when you are making progress—having a plan to assess movement towards the vision for all children. The MSRTs were involved in many activities to assist teachers, administrators, and other staff members in understanding standards-based science and mathematics teaching and learning and the alignment of curriculum to performance-based assessment. Some MSRTs were also able to bring issues of equity into the discussions of science and mathematics learning.

Within this category of curriculum and assessment, five themes emerged. The MSRTs engaged teachers in examining national standards, the MPS mathematics and science curricula, district and state assessments, and issues of equity. They also assisted teachers in piloting curriculum programs and in developing and modifying units and activities for classroom use. Each theme is listed below with illustrative examples from the MSRT reports.

Helped teachers understand the MPS mathematics and science curricula, national standards, science and mathematics connections, and integrated curriculum.

- In the beginning of November, I started to work with the fourth grade team of teachers from one of my schools. These three teachers asked if I could work with them during one of their family planning times to help work through some of the experiments in the rock unit from the MPS science curriculum. The school science resource teacher was invited to this meeting, he also is involved with Project Science. We discussed the process skills and I knew it was only the beginning of a journey to understand the scientific process and then to teach it. After a very rich discussion, I was invited to teach the first lesson in each of the classrooms. I got the teachers involved by giving them the manual and having them use some of the questions from it to have the children process the lesson. This went well. The teachers began the second lesson by discussing with the children what they learned the previous day. We team taught the second lesson and then processed as best as we could in between the activities. In the third lesson, I tried to help the teachers expand their wings and do most of this lesson on their own. I observed many things and noted where I needed to take these teachers to help them develop further: (1) How to pass out science tools; (2) How to examine a science lesson and think about process skills; (3) How to have children discover, learn, and reflect on their learning; and (4) How to use a science journal.

- Since the teachers in grades K-2 do not use a mathematics textbook, it is important that the teachers decide what is important to teach and when. With many new teachers this is even more vital. My next task will be to develop a framework for aligning the curriculum. I am searching for concepts/topics to help form the framework. From there, I believe that the teachers themselves will need to examine the curriculum. This is an awesome task, but one that this staff is ready to take on.
- There is a process going on to set up math meetings to establish a common curriculum across grade levels. The teachers have agreed that they need time beyond their teaching day. The principal is now considering pay to support teachers in their efforts.
- For the last three months, I have worked with individual teachers and groups of teachers discussing the national standards in mathematics and science. During these discussions, the teachers shared with me and each other some of their needs to raise students achievement. Some of the needs mentioned were: (1) Classroom materials, such as computer software, manipulatives, books, and computers; (2) Professional development in classroom management skills, alternative strategies to use with students, time to share successes with other teachers, time to plan integrative activities, and cooperative learning strategies; and (3) Ideas, such as the following. How do I reach all students? What skills work best with inclusion? How can community support be a part of my classroom support and resources? What block scheduling activities will be most beneficial for student learning and retention?
- A draft plan to promote dialog with math staff and with the Science/Mathematics Learning Coordinator was made that attempts to organize the three years of CMP curriculum so that incoming sixth graders are taken into consideration in the multi-level age grouped classrooms.
- At common planning meetings with families, I have found out about the upcoming curricular themes. Several science teachers were about to study anatomy, beginning with bones of the human. I shared with the families an activity that involved data collection to compare certain bones with height to see if a formula could be derived to predict height from a particular bone, or vice versa. Two or more families are using the "bone" data collection as an integrated activity in math and science classes. A second activity was prepared and shared with mathematics and science teachers that involves neurology, a topic appropriate for the upcoming exploration of the brain in biology. At the request of one teacher, a class set of the data collection component of the activity was prepared for cooperative learning groups. The sets consisted of sets of words typed in colors that match or don't match the color name. Students will time how long it takes to read color matched words and matched words, and then they will analyze the results and discuss brain functions. At least four or more science math teams are intending to do this activity.
- The teachers agree that many of their students need additional concrete experiences. Their quandary is, "If I do this, how am I to cover the material in the BOOK?" We discussed whether it is more important to develop a concept well and have high student success and positive attitudes or cover everything and have little learned with students that are frustrated and unable to apply the concepts later. "But what about next year when they have not had all of the chapters in the book?" There is a need for a school plan that would address these concerns.

- We have set up a series of workshops based on a survey of interest from the teachers. The first will cover both math and science as well as making math and science connections with other areas of the curriculum.

Developed opportunities for teachers to better understand state and district mathematics and science assessments.

- The principal hired a substitute teacher for two days and the principal covered classes along with the assistant principal to allow teachers to meet with the science resource teacher and myself. The meetings focused on the district's performance-based science assessment as a way to improve the teaching of math and science. I was asked to locate resources and to oversee the grade level time lines. Ultimately, the staff and administration came to the decision that the math curriculum needed to be realigned to the fourth grade Terra Nova exam, the fifth grade ITBS, the NCTM Standards and the state standards.
- I reviewed and explained the results of the ITBS (Grade 5) with the principal and learning coordinator and arranged for teachers from each school to sit and examine WSAS and develop a list of strategies and skills that will need to be taught.
- I arranged for all teachers at one school to take the ITBS and then evaluate the results and discuss what implications this has for our teaching.
- I met with teachers and district specialist about the new district science assessment. Then we shared information with schools about the current assessment plan, how it would be scored, and where we as a community of learners need to work together to develop a program for students.
- I have kept teachers aware of all available information regarding the upcoming district-wide assessment and have demonstrated science lessons that contained the process skills that are involved in assessments.
- I shared information on performance assessment with all of the science staff, not just the seventh grade teachers.
- I have done holistic scoring with another MSRT to help the teachers score the mathematics proficiency for middle school.
- I graphed the results from the item analysis of the ITBS school results for the test analyzing committee in my schools.

Identified and discussed equity issues with school staff.

- I obtained information about workshops that dealt with strategies to reach all students and to get more females involved in higher level math and science classes. I attended these workshops with some of the teachers. After attending these workshops, we worked on ways to share the information obtained with the other teachers in the school.
- I spent time discussing tracking with the principal, and was able to put some fears to rest.
- I shared with the staff the results of last year's ITBS assessment during a banking time day. They were shocked, and the issue of equity was discussed. A teacher from the building was the first to engage in the conversation. Hooray!!
- At one of my schools, sixth grade students are tested and then tracked into the top or bottom group for math. A teacher and I had a number of discussions about the problems created for students when tracking is used. Fortunately, the principal, who has gone through the efficacy training, assured me that there will be no tracking of the sixth graders next year.

- I have begun to bring equity into as many discussions as possible. The results have been mixed, ranging from "we really need to look hard at our school data" to no response. In one particular meeting I pointed out the discrepancy between scores of white/ Hispanic students and black students on an all-school problem solving test. Not one comment was made by staff. I believe staff will become more comfortable examining equity issues if I and other staff members continue to bring them up.
- In using data to drive reform, I've analyzed testing data with staff to determine appropriate instructional strategies. I've also been involved in revising the assessment section of the educational plans in both schools so that it aligns with sound educational practices that address achievement gap issues.

Assisted teachers in developing and modifying units and activities for classroom use.

- This school has a science lab which uses the MPS adopted science resource book to form lessons. Students rotate through the lab. With the science teacher, I developed extension activities (to be used in the classrooms) for the units that are covered in the lab at each grade level. I then make myself available to the classroom teachers to discuss and implement the extension activities.
- A first grade teacher and I have been developing an extension unit on water that correlates to the activities that are being taught in the science lab. I gathered resources and we conferred together to view the resources and decide which activities we would work on with the students. We are in the process of team-teaching the chosen activities.
- One K5 teacher expressed a need for ideas to improve her science center in the classroom. I gathered ideas for the center on the theme she was working on and put together the center.
- One third grade teacher is comfortable with the science curriculum, but wants some extension activities or supplemental activities. I have given her ideas for experiments that the students can conduct and how to incorporate the scientific process into her lessons. I have made myself available to assist her during the experiments.
- The teachers and I go over their questions about science. Then I assist in designing units and lessons. After the unit/lesson is designed, we review what the teacher is comfortable or uncomfortable with and we co-teach.
- I assisted in developing lessons, as requested, by a teacher to help the educational assistant work more effectively with students with low math skills.
- I taught a geometry teacher how to use the orienteering compass and how to set up an orienteering course in front of the school. I loaned her my lesson plans. She was encouraged to teach applications of the Pythagorean Theorem and trigonometry earlier in the year.
- I worked with two third grade classrooms by meeting with the teachers to discuss the science kits that they would be receiving. We discussed which lessons would be done and sketched out lesson plans. We will team teach these units in March.
- I worked with kindergarten teachers at one school to develop an integrated theme around the concept of weather.
- The science lab teacher at one school wants to do a supplementary unit on plants for grades 2 through 8. I was able to pull together a variety of activities and investigations for each grade level.

Assisted with pilot projects.

- I have helped to work with the students who are piloting the Lifetime Math Project. The main area needing help is the computer lab. Students have questions and "forget" to access the built in hints, or they don't understand them.
- The math teachers are piloting the Interactive Math Program for MPS. I am currently planning several inservices on the implementation of this curriculum with a math teacher based on my LUMR (Leadership in Urban Mathematics Reform) experiences.
- I have also introduced a math program to the principal at one of my schools and the principal shared it with staff during a Banking Day and now the school is involved piloting the program. The company has agreed to provide one grade level of materials for each grade level the principal will purchase. All the grades K-5 have received kits. The company has come in to inservice each grade level.

CLASSROOM TEACHING AND SUPPORT

Teachers, administrators, and other staff members from the first wave MUSI schools joined the expedition at different starting points. Some were well on their way to implementing standards-based science and mathematics and others had to start at the very beginning of the journey. This unevenness of understanding and implementation was expected and required the MSRTs to use multiple strategies and approaches. They had to entice some teachers to join the trek and enlist the knowledge and experiences of others to join together as a learning community.

Within this category of classroom teaching and support, four themes emerged. The MSRTs conducted demonstration lessons, taught collaboratively with other teachers, served as a feedback source for teachers through classroom observations, and worked with individual and groups of students. Each theme is listed below with illustrative examples from the MSRT reports.

Team taught within classrooms.

- A K4/5 teacher has frequently asked me to team teach with her in order to help her students develop an understanding of early math and science concepts. We often split the class into smaller groups to do activities and afterwards we discuss what the students' responses were and determine the direction to take to continue to move them forward.
- I worked with a fifth grade teacher to help her better understand the scientific process. I gathered lesson ideas which incorporated the process and conferred on developing lessons which we team taught to the class.
- I have modeled lessons and team taught lessons using literature and math. This was an avenue not previously explored by staff and created an interest for others. Teachers were also provided with resources to present additional lessons using literature.
- Perhaps the most exciting and rewarding activity in which I am participating is the planning, implementing and teaching of a fifth grade math unit on percents, decimals and fractions. The fifth grade is departmentalized, so one teacher teaches all math concepts for the three classes. The LD teacher and I are using TERC materials, emphasizing the discourse and problem aspects. Students initially were hesitant to share, but with the continued practice, ALL children are sharing and communicating. One important comment that I heard was from the LD teacher was that she was very skeptical having her students embark on this course, but now she can see growth and thinks that this is the way to teach.

- I assisted a teacher with "regrouping with manipulatives." We used a three-day plan starting with modeling a lesson on the first day to team teaching on days two and three.
- There have been a lot of requests to team teach in giving of the prompt of the week and in the area of facilitating discourse.
- One teacher has established that he wants to teach more hands-on science. In essence, without directly saying so, he wants to move beyond teaching vocabulary and comprehension questions. We now collaboratively conduct hands-on investigative science lessons at least once a week.
- I had previously helped an eighth grade math classroom (described as low level) with classwork and was asked to help with the use of TI-82 calculators. The teacher had been inserviced one or two years before and though the calculators had been in the building for two years, they had not been used. I was able to facilitate her use of them by literally getting them from the learning coordinator, putting in batteries, and finally helping her in her classroom during an investigation activity.
- At one school I team taught a nutrition unit with a science teacher for a week. This first year teacher is really struggling with classroom management. We taught at least three classes together each day and did a lot of reflecting during prep period. We made some progress on classroom management and I think we both learned a lot by taking the time to reflect on issues of class management, content, and pedagogy. We allowed students to explore the ideas and minimized our talking at them.

Conducted demonstration lessons and modeled techniques.

- I feel that I have helped several teachers take steps towards improving their math instruction by modeling lessons and helping them extend their own lessons to incorporate student communication—written and oral explanations. I also provided them with additional resources to continue in this vein.
- I carried seven data gathering, math-oriented science "experiments" into the classrooms. They are (1) Woolly Bears, (2)Comparing Students' Height and Widths?, (3) How Far Can We Jump?, (4) How Heavy are Liquids?, (5) Using the Balance, (6) How Fast Does Ice Melt?, and (7) Hot Air Balloons. The third grade teacher told me that she didn't teach science because her school "had no chemicals." After seeing my assessment/standards oriented activities, she has now attempted several classroom data gathering events and her students have graphed the results.
- In the beginning of the school year a fifth grade teacher was concerned that his students were not motivated and would give up on a problem after only one try. We worked on getting the students to feel good about what they could do in math. When they were almost ready for the end-of-chapter test, I challenged the boys and girls and told them that if the girls won, I would have a pizza party with them or if the boys won, I would have a party with them. Historically, the girls were doing better than the boys in math in fifth grade at this school. Guess what? The boys won, and we had a pizza party and invited the girls to come anyway.
- Classes of students are taught by a science lab teacher. The lessons were usually teacher directed. I have spent much time demonstrating and making suggestions to try to make the lessons more inquiry and process oriented. The person teaching in the lab is very creative and open to ideas and suggestions. This teacher has begun to try a more open ended inquiry method with the students. There has been a sufficient amount of positive feedback to indicate that this trend should continue.
- I was able to assist a teacher trained as a science teacher to teach basic Algebra classes through the development and modeling of specific lesson plans and peer coaching. He

has implemented these lesson plans with a measure of success and replicated the instructional strategies that he observed when I taught several demonstration lessons.

- One teacher, who does a lot of rich math, wanted me to teach her and her students how to use graphing calculators. So I pulled some activities together and taught her five classes for two consecutive days. While I was working with her classes, she was busy learning how to use the calculator and worked on some separate problems of her own. I think she saw value in using the calculators with her students and expect she will use them in her classes when appropriate. I will follow up with her so she feels comfortable and competent with the calculators.
- A first year math teacher was struggling with class management, but wanted to try and engage his students at a higher level. This teacher came to the Banking Time Day meeting (math/science professional development session) and found a rich problem for me to model with his classes. I taught for a few periods and then had the teacher take over.
- I have taught math and science in a couple of social studies classes. In one class I taught a two day unit on radioactive decay. To understand the concept, I had students tear pieces of paper in half over and over and then use M&Ms to model the decay. With follow up activities and problems, the students developed a good sense of radioactive half-life. In the other social studies class, I was asked to bring graphing into a lesson. So I collected some data from that school and from Milwaukee to make the investigation more relevant. The students graphed some 30 year rainfall data versus the past year's rainfall and compared the two. They did the activity by hand first and then I showed them how to do a scatter plot on a TI-82 calculator. It went over well and the students were engaged in the activity.
- At one school, I have pre-surveyed each of the Connected Mathematics Project booklets that the teachers were about to use. I made certain that manipulatives such as angle-rulers and polystrips were purchased, and I requested that class sets of geo-shapes and number puzzles be made for the teachers. I met with each mathematics teacher to show her/him how to use the angle rulers, polystrips, and geo-strips. I gave them tips for the management of these manipulatives such as providing zip-lock sandwich bags for bagging the appropriate geo-pieces for the day, and I made suggestions about handing out and collecting the materials. I helped out in each teacher's class and thus modeled how to interact and to use inquiry with the students in the collaborative groups. When possible, I tried to debrief the lessons by asking the teachers to reflect, "What went well?" What would you change?"
- I provided a demonstration of how to introduce the spreadsheet by having students form a "human spreadsheet" that passes information from cell to cell.
- For three days in March, I have arranged to take three classes and at least nine teachers on all day Ice Age Trail hikes. Over the years, I have been invited along on outdoor trips. I have seen entire days more or less wasted as kids just hiked along and didn't do much of anything. Activities on these trips were at a minimum and lacked focus. On the upcoming trips, I have data collecting worksheets on weather and I have individual and team scavenger hunts for the students. The teachers will see how to provide fun, do-able activities for children in the outdoors.
- I demonstrated a lesson on the water cycle (kindergarten). All the classes in K4 and K5 participated in the lessons. Then discussion occurred as to the specific strategy I was modeling—that of questioning.
- A first year teacher has been looking for ways to teach integers and solving equations with one of her sixth grade classes. I introduced her to algebra gear and then taught her class for four days. The class was very responsive and the teacher and I took a lot of

time to debrief after each class. We planned out the following week and I think she feels pretty confident about using the algebra gear on her own.

- A fourth grade teacher wanted to see how the scientific process could be connected to animal adaptation. So, I dusted off a performance assessment and modified it to fit the standards and modeled it in the classroom. She seemed relieved to see how simple it was. I've found that many teachers feel insecure about teaching science because they're not sure what standards-based instruction looks like. Given the opportunity to watch their students' reactions to inquiry-based pedagogy, teachers have become much more open to taking some risks.

Observed and supported teachers in the classroom and provided feedback.

- I particularly enjoyed a visit to one teacher's sixth grade math class. The teacher is piloting the Mathematics in Context Project, and was working on the module, *Patterns and Symbols*. The lesson was on symmetry. After class, I asked if this teacher would be interested in trying to use Miras with her students to continue teaching symmetry. The teacher tried them out the next day and students were absolutely enthralled with them—no one off task here.
- In one instance, a teacher was lecturing to the students for the entire class period. The students were frustrated because the teacher was moving too fast and not involving them in the learning process. The teacher and I met a number of times and discussed setting up cooperative groups, the student responsibilities within each group, and the best way to assess individual and group work while keeping in mind the desired outcome. The next time I came to observe the students' behavior, the teacher and I were very pleased with how the students were working in groups, sharing and talking content within each group, and presenting to the class their findings with the teacher as a facilitator rather than lecturer.
- I worked with a fifth grade teacher on a division unit to discuss the word problems she would be giving to the students. I observed her lessons and gave feedback about her questioning technique, giving her ideas for developing division strategies.

Worked with individual or groups of students.

- I work with 6 fifth and 6 fourth grade students twice a week on the weeks that I am in the building to improve their problem solving skills and conceptual understanding of math. Another group of 6 fourth grade students works with me on problem solving skills and reasoning.
- I've worked with pull-out groups on assembling deer skeletons, constructing hot air balloons, mirrors, using the tools of math, leaf collections, and leaf rubbings.
- I see myself as a role model to the fifth grade girls in an effort to get them to see that girls can succeed in math.
- I have been working with students on an individual and group level in math. With the approval of the teacher, I work with the students on the math areas that each student feels he/she is having the most difficulty. I teach students strategies they can use in all classes that will make them accountable for their own education. We talk about real life applications, careers, goals, expectations, modalities of learning, people skills, and taking responsibility for their own learning. I continue to enjoy the student contact time that the teachers have allowed me. The students continue to place notes in my mailbox requesting my services when I am in the building.
- I helped students prepare for the Mathematics/Science Fair held in December. I mentored individual students working on mathematics projects. I worked the day of

the fair to help "runners" find the schedules of students who needed to be interviewed by the judges.

- I helped students in several classrooms to pick out topics for their science fair projects. I also helped other classrooms to use the steps in the scientific process to write up their experiments.

RESOURCES

No journey could be a success without the necessary supplies to sustain its travelers. The MSRTs assisted in making the needed supplies available for the journey. Within this category of resources, three themes emerged. The MSRTs located, gathered, and ordered materials and resources and assisted in increasing the use of technology. Each theme is listed below with illustrative examples from the MSRT reports.

Assisted with technology—curricular infusion, getting teachers online, and technical support.

- A highlight was finishing the alignment of the Science Explorations software with the middle school curriculum and actually have someone use it!
- Logo (computer language) materials were provided to the math lab teacher who, every nine weeks, has students draw geometric figures on the computer to complete the booklet, Shapes and Designs. Most teachers had intended to skip this chapter.
- I have helped with computer technology on quite a few occasions, loading things, running programs that aren't familiar to the lab teacher, trying to get things to connect to the curriculum, trouble shooting, demonstrating for the students. I've also done some computer troubleshooting for the computers in the library.
- I have started to develop time lines for a three year technology plan for both schools.
- A math teacher wanted materials on scientific notation and exponents. I asked at a COSMIC meeting and on the MPSnet and received answers within 24 hours.
- A teacher has asked to learn how to use the Calculator Based Laboratory with his Physics class.
- I have modeled many lessons in both math and science classes that use the collection, graphing, and analysis of data. Most of these lessons have also incorporated the power of the graphing calculator to handle data lists, tables, graphs, linear regression lines, etc. The lessons were intended to teach students while modeling content-rich, inquiry-based lessons for the teachers and to raise the comfort levels of some of the teachers in the use of technology in the classroom and the classroom management involved in its use. Science oriented data involving temperature or time was used. In some math classes, students compared different situations (systems of functions) and analyzed "what if" questions. Students who had never before used graphing calculators were given the opportunity to do so and their engagement was intensive! A number of these teachers have invited me back for follow-up sessions. The science teachers and one mathematics teacher still do not feel confident using the technology on their own, and more opportunities for growth are needed with the assistance of this MSRT.
- I installed, in both schools, the FirstClass Client software on several computers. I demonstrated how to use the system so that teachers could begin to communicate with me when I am not in the building and dialog with others in the district.
- In my one school with access to the Word Wide Web, I got the kids and language/math teachers involved in finding homepages of eastern U.S. maple syrup producers. Using

this information and information from Colliers on CD-ROM, the students did some original research and some well done reports on maple syrup.

- I am working with the lower grades and offering ways that the calculator can be used to enhance learning. I am seeking out activities that are appropriate to these grade levels and then sharing them with the teachers during our meetings.
- With the collaboration of another MSRT, four algebra teachers in four high schools worked together on a project in which their students interviewed the students in the other schools. The interviews and the results of the surveys were conducted using the Linked Learning Lab.
- Textbooks were translated into the target language but they didn't have much "kid" appeal. They were word processed but not formatted using desktop publishing. I found Aldus PageMaker on the hard drive. After learning how to use the translators' scanner and PageMaker, I worked with the translators to improve the texts they are translating. A big advantage is page layouts only have to be done once and then the language text added. I'm NOT saying that the math texts had been poorly translated, just that I think I provided the books with a different feel for math that the math teachers don't have time to give.

Gathered and ordered materials and located resources.

- I gathered supplemental materials on plants for the intermediate ED teacher and demonstrated a lesson on seeds. We dialogued about the teaching of science.
- Before winter recess, I shared some Marilyn Burns replacement units with two of the teachers. I shared why I thought they might like to connect to some of these lessons as they begin money and multiplication. To my surprise, it was on the fourth day back from vacation that I was able to connect again with these two teachers and they already had begun to use these resource books. The enthusiasm on my face was not hidden and I think they knew I couldn't wait to make an appointment with them to come and watch their children learn. This to me is a giant leap into a content-rich, standards-based classroom.
- I have shared videos for teachers to learn new skills, e.g. stem and leaf plot. I have helped locate math materials and manipulatives for an LD teacher. I have procured resources for the seventh grade math teacher—calculators, rulers, OH equipment.
- In trying to meet the needs of the teachers, I obtained manipulatives for a number of teachers as well as a conducted a presentation on how these manipulatives can best be used with the students.
- In November, I provided the mathematics and science teachers with materials that described what kind of statistical approach should be used with which kind of data. The teachers were getting students ready for the mathematics and science fair.
- I provided and continue to provide materials and encouragement to a new teacher who is having difficulty teaching math to Spanish dominant students who have rudimentary reading and vocabulary skills in English. The materials that I provide involve the use of manipulatives, colored pencils, and other things.
- A large binder of activities that involve bridges was provided. It was most useful for the science and the industrial education teachers. Similar binders are being prepared on weather, modes of transportation, and other science topics. I am also preparing a binder of potential STW projects which are math and science oriented.
- A goal the principal and I have established is to create a resource library for the teachers that is easily accessible.

- Two teachers were interested in compasses, wind direction, and wind speed. I picked up six compasses from the MPS Kluge Science Center and six anemometers from a nearby middle school. The teachers and students received some good minds-on experiences with these materials when we used them in preparation for our field trips.

Located and inventoried equipment and materials.

- The school has invested in science equipment over the past several years, but teachers were not aware of all the equipment. I inventoried the equipment and distributed a copy of the inventory to each teacher. In addition, I organized the cabinets which house the equipment so it was more accessible to teachers and easily found.
- The principals, learning coordinators, science teachers, and myself identified needed science supplies in my schools. Then science orders were prepared and returned to the school secretaries for submission to suppliers. As of this report, two orders have actually been placed.
- I took an inventory of the mathematics and science materials in the storage room, typed up the list, and gave it to all staff members.
- At another site there was little hands-on science or mathematics instruction using manipulatives. In fact, there was little or no science equipment in the building. The staff apparently relied on the MPS science kits when available for all of their supplies or presented the content through discussion. My first task was to gather materials, place orders for basic equipment for the school, and assess what kind of teaching and learning models were being incorporated in the classrooms.
- I was able to locate brand new, unused manipulatives for the math teachers who wanted them. It took me awhile to find the hiding (storage) place above the auditorium.
- One Exceptional Education teacher had no books for his students, so I got some recommendations from a UWM professor. The principal said he will order the books in January for that teacher.

PARTNERSHIPS FOR LEARNING

Any journey is more likely to be a success if people join together. Within this category of partnerships for learning, four themes emerged. The MSRTs worked to form and strengthen partnerships with families, businesses, informal education agencies, and other community agencies. They also sought to form partnerships between and among schools within MPS. Each theme is listed below with illustrative examples from the MSRT reports.

Linked staff between schools and brought other MSRTs and UWM faculty to the schools.

- I have been a volunteer teacher/helper at three secondary schools. I help teachers in these schools in the area of science because their MSRT has a math orientation.
- A science teacher, who was working on a project involving the study of hot air balloons received a number of pages of resources downloaded from the internet. I was also able to put this teacher in touch with others knowledgeable about the same subject and/or conducting similar projects, thus enhancing inter-school coordination and continuous learning. My involvement in the Balloon Project is leading to extra-mural and intra-mural cooperation since an elementary school and a middle school have requested that the high school students visit their classes and provide one-on-one assistance to students as they attempt to replicate the project.

- I asked a UWM staff member to attend a science meeting to offer his help in developing some science units.
- I talked with the principal about getting CMP materials and he was very receptive to the idea. In fact he suggested that I take the sixth grade math teachers to a school that is currently using CMP so they can see it in action.

Contacted business partners , informal education agencies, and other community agencies.

- I helped the school social worker plan for a Careers on Wheels day in October. I contacted businesses such as Channel 4, Warner Cable, Ameritech, and the U.S. Postal Service, in an effort to get them to send vehicles and staff to our Career Day to talk to students about math and science skills needed to perform their jobs and run the vehicles.
- One school is working on a junior space camp for children and I am assisting with that along with the 128th Airborne Mentor Program.
- I have worked with the technology people and HPPI (Health Professionals Partnership Initiative) planning grant writing to improve technology at both schools. I have participated in the SDC (School Development Council) and the Business Partner meetings at the schools. I have assisted on field trips run by HPPI to UW-Madison, Marquette Dental School, and Sinai Samaritan Hospital.
- I informed several science teachers about the environmental projects sponsored by the Sixteenth Street Clinic. They met with Mr. MacAvoy and are planning projects that will involve several nearby elementary schools.
- I participated in the Museum and DNR meetings because I am personally committed to the idea that the entire community has a role in the education of our children.

Facilitated links with families, parent groups, and parent centers.

- I provided simple math and science activities which the students can do at home with their families. These activities are printed in a monthly newsletter that is written by a student newspaper club. A student interviews me and writes the article based on his notes from our conversation.
- I have facilitated parent meetings on mathematics for one of my schools.
- I have been involved in parent meetings at both sites, and will continue to have discourse with both groups. Planning is occurring for a Family Math Night which may occur in March at one school.
- My attendance at parent meetings, faculty meetings, parent conferences, and the Internet class for parents of students has been a vehicle for bringing the goals of the MUSI project to the school community.
- At one school, I have made a concerted effort to establish a dialogue with the parent organization and have attended some of their meetings and have made sure to go to their office on campus when I am in the building. I have been able to meet a number of parents and volunteers. I make sure to discuss math and science when I can.
- At one school, attendance is poor. This is very harmful to learning mathematics. Noting that I was unable to change the social climate outside of the school building, I asked what I might do to address poor attendance and failures in mathematics. I approached the head of the Parent Center and asked if he would help us contact parents regarding the need for students to attend tutoring sessions after school. He enthusiastically accepted. I shared this idea with the head of the mathematics Department who made up forms for teachers. Math teachers record the names of students who are failing or who are getting low grades. The students are asked to

attend the tutoring sessions which are available Monday through Thursday. The lists are given to the Parent Center and the volunteers contact the parents of these students. A follow up is being made on which students do attend the tutoring.

- I am collecting information about the parent center at one school to share with the new parent center at my other school.

Helped with school-wide mathematics and science events.

- I provided some materials on Lego Math to the parent coordinator upon her request. She was planning a family activity and wanted to center it around Legos.
- Last year's science fair coordinators are no longer at this school. I exposed the new organizers to other school science fairs.
- Since arriving at this school, I have received the message that I can help with the science fair. This seems to be a big, overwhelming event that takes place in the spring. I provided the science fair organizer with a booklet containing information on how other people do science fairs. She indicated that this was helpful and chose to make some adaptations.
- Three MSRTs volunteered their time helping fourth graders prepare for the annual science fair.
- I assisted with family math and science night—planned with the school implementor and science teacher. I helped gather materials and got volunteers (students, parents, teachers, teaching assistants).
- I assisted with the preparation and the running of the science fair. I went to each room and discussed the children's projects with those that needed assistance. It went very well and their were some good quality projects. I also supervised the fair during the day.

OTHER ACTIVITIES

The MSRTs were engaged in many varied activities to support the school and classroom communities of learners on their journey. The following are examples of some other activities a few MSRTs reported that did not fit clearly into the above categories and themes.

- I encouraged several science teachers to present at the Wisconsin Society of Science Teachers convention in Milwaukee this spring and got their proposal mailed for them.
- I was able to assist another teacher making the transition from non-instructional duties to the classroom by providing instructional feedback, materials and assistance to enable her to meet the needs of students in her Algebra Support classes; the teacher/student ratio and the ability of the teacher to individualize instruction was improved when I was able to assist in the transfer of students not requiring this type of instruction out of the class.
- In both schools I have developed a monthly newsletter that I distribute to the staff. It lets them know when I will be in their building, projects I am working on in the building, district events or staff development opportunities, and conferences or conventions sponsored by math or science organizations.
- During January, I met with the math teachers to draft a survey and interview questions for ninth and tenth grade former students. The plan is to visit some high schools to meet with students and teachers to obtain information regarding mathematics instruction. This data will be used to evaluate the school math program and consider any adjustments to improve the middle school program. In the past, ninth grade

students have been surveyed regarding the middle school experience in general. This year, the plan is to focus on mathematics. My contribution to the plan is the interview, the extension to tenth grade, writing of the instruments with another teacher, and to consider students' *perceptions* of mathematics not only their experiences. The visitation will take place in the spring. I have suggested that a similar plan be extended to the elementary feeder schools, especially in science.

- At one school I arranged for a group of preservice students from UWM to do their math, science and social studies field work assignments at the school. The teachers have a team of two students in each classroom on Thursdays to work with the students. The teachers are very pleased with the program.
- At one of my schools, I have helped to set up regular after school meetings of the math and science teachers. I have worked with art, Spanish, and social studies teachers to get math into their classrooms.
- I have worked with a technology education teacher to develop hydroponics technology in his greenhouse and possibly create a class based on hydroponics. I set up a visit to a hydroponics farm on a banking time day where we got a lot of good ideas for setting up a small scale unit in the school greenhouse. The principal is open to offering classes in hydroponics if this technology education teacher wants to get into it on a deeper level. That is a very exciting possibility for that teacher and for me.

CHAPTER 4

DISTRICT COMMUNITY OF LEARNERS

To invite more individuals to join the journey, the Mathematics/Science Resource Teachers (MSRT) were also involved in enhancing the district community of learners. This included strengthening connections across schools and with individuals throughout the district. For the first two reporting periods, the MSRTs described activities and tasks in which they had been involved that enhanced the district community of learners. For the third report, some also included listings of additional activities. All of these responses were combined and then analyzed for patterns of similarities and differences across the entire cadre of MSRTs.

Many of these activities were conducted after school hours or on weekends. These activities, whether for a limited duration of time or on-going, contributed positively to the quality of mathematics and science instruction throughout the district. Four major categories were identified from the responses. They included (1) facilitators of MPS staff development, (2) presenters for events outside the district, (3) memberships on MPS committees, and (4) other activities beyond the district. Many MSRTs planned and facilitated numerous staff development opportunities, inservices, and workshops for teachers district-wide and for schools other than their assigned MUSI schools. These generally also took place on Saturdays and after school. Some MSRTs also served as co-instructors for UWM/MUSI courses in the following areas: algebra, elementary mathematics, elementary science, middle and high school science. Many MSRTs also served on district-wide committees.

FACILITATORS OF MPS STAFF DEVELOPMENT

Many MSRTs served as facilitators or instructors of staff development opportunities for teachers. These included workshops, inservices, institutes, UWM/MUSI courses, and MPS staff development courses that were offered to teachers within the district. They included the following.

- Geometry Network
- ACT (Assessment Communities of Teachers) Institutes
- Connected Mathematics Project Pilot
- Mathematics in Context Pilot
- Managing Manipulatives workshop
- Implementing the Standards in the Classroom workshop
- Conceptually Understanding Multiplication and Division workshop
- GEMS course
- Equity 2000 Saturday Academy
- Science Assessment inservice
- Math and Music is Fun, City-wide Early Childhood Inservice

- High-Scope inservice
- Leadership in Urban Mathematics Reform (LUMR)
- Project Science
- Science Performance Assessment inservices

PRESENTERS FOR EVENTS OUTSIDE THE DISTRICT

Many MSRTs were engaged in events that took them beyond the district. They presented at mathematics/science conventions, conferences, workshops, and leadership or training institutes outside of district. This allowed them to network with other educators throughout the country.

- Connected Mathematics Project inservice, Ann Arbor, Michigan
- Algebra in Action workshop, Milwaukee Area Technical College
- Grant Writing Workshop, UWM
- ACT Institute Leadership meetings, Pittsburgh, PA, and Newton, MA
- Connected Mathematics Project, Michigan State University
- Mathematics in Context, National Council of Teachers of Mathematics
- National Association of Educators of Young Children, International Global Summit on Science Education
- The National Science Standards and Equity and Assessment Multicultural Institute
- WSST (Wisconsin Society of Science Teachers) convention
- WEST (Wisconsin Elementary/Middle School Science Teachers) Westfest
- Sally Ride Academy, Wauwatosa, WI
- NSTA National and Regional Conventions
- NCTM National and Regional Conventions
- Wisconsin representative, National Algebra Symposium

MEMBERSHIPS ON MPS COMMITTEES

Many MSRTs served on committees or assisted with other activities within the district. This allowed them to stay informed on district activities and to provide leadership on district issues.

- Math It's Not a Problem writing committee
- Elementary Math Pilot Project
- Drafting Elementary Benchmarks in Mathematics
- ACT (Assessment Communities of Teachers)
- City-wide Mathematics Department Chair meetings
- District Science Assessment Committee
- District Science Content Committee
- District Science Curriculum Writing Committee
- Committee to develop Grade 8 Exit Requirements for Science
- Judged Science Fairs at numerous MUSI and non-MUSI schools

- Edited district assessments
- Project Science team member
- Science Benchmarks committee
- Writing performance assessments in Science for district-wide testing
- Scoring Assessments and/or training scorers
- High School Biology Adoption committee
- Mathematics Proficiency writing of items and translating items into Spanish
- Writing Performance Mathematics assessments for grade four and five
- Algebra Network member
- Milwaukee Teacher Education Center committee
- MPS Council of Councils
- Milwaukee Early Childhood Council
- Textbook selection committee for reading
- Hydroponics gardening (Information and access for MPS teachers)
- Portfolio handbook for high school teachers and students in mathematics
- Museum planning committee
- Participation in US Department of Education evaluation of MPS Eisenhower funding
- Attended UWM/MUSI courses

OTHER ACTIVITIES BEYOND THE DISTRICT

Some MSRTs were also engaged in other types of mathematics and science education activities that extended beyond the MPS district. These included serving as officers in professional organizations and participants in state and national projects.

- Presidential Commission for Preparation of a National Eighth Grade Assessment in Mathematics member
- Milwaukee Area Mathematics Council secretary
- Wisconsin Mathematics Council newsletter co-editor
- Several MSRTs were WASDI (Wisconsin Staff Development Initiative) participants
- Society of Elementary Presidential Awardees district director
- Alverno Portfolio Assessment for Prospective Student Teachers
- Mathline participants
- Mathline facilitator
- Society of Milwaukee Area Science Professionals officer
- Committee chairperson and committee members for WSST convention held in Milwaukee
- Wire Wisconsin volunteer
- LUMRnet member

CHAPTER 5

STRATEGIES TO GAIN ENTRY

This chapters describes strategies used by the Mathematics/Science Resource Teachers (MSRT) to gain entry to teachers as an initial point of contact. Rather than mandating a specific set of requirements for each school, the Milwaukee Urban Systemic Initiative (MUSI) used the model of developing communities of learners around science and mathematics. Thus, it was important for the MSRTs to find ways to engage teachers within the context of their school around the unique strengths and needs within each setting.

The MSRTs used several different strategies to entice teachers, administrators, and other staff members to join the expedition. The responses were analyzed for emergent themes and then sorted into four categories: (1) share curriculum, instruction, assessment, and resources; (2) participate in activities with teachers; and (3) be accessible and be a good listener. All of the comments and suggestions by the MSRTs are listed below by category and theme.

SHARE CURRICULUM, INSTRUCTION, ASSESSMENT, AND RESOURCES

The strategies in this section highlight knowledge and tools that the MSRTs had that would benefit and interest teachers. The MSRTs, in general, were familiar with the MPS science and mathematics curriculum and national standards, were skillful teachers, were knowledgeable about district and state assessments, and had access to resources. The MSRTs were selected because of their strengths and through additional training have become even more knowledgeable of district, state, and national policies and standards. The following themes and examples describe how they were able to use their strong knowledge base as vehicle to gain entry to teachers.

Use district and state assessments.

- The ITBS, WSAS, and MPS science performance assessment have provided many initial entries, mainly because we as MSRTs have information which they might not have. Being able to explain the data and having information from the MPS Curriculum Specialist on the mathematics topics has been helpful.
- Attended faculty meetings and engaged teachers in a discussion about assessment.
- Used the concern over assessments as an opportunity to share ideas about preparations for them.
- Helping out with the science assessment and preparing for it was a great way for me to get into rooms and work with teachers. They knew we were in it together.

Have something to share.

- I think word of mouth was another way that people decided that they wanted to work with me. In one of my schools I worked with an art teacher on simple machines. After that she suggested that a computer teacher, who was going to have students draw the plans for a kite on a computer, contact me to work with her and her students.

- Sharing resources on topics I saw being used in teachers' classrooms and relating it to math and science was helpful.
- I offered various opportunities and information to my teachers on workshops, grants, and so on.
- I found it much easier to get into the classrooms when I had something specific to share such as The Math Game materials, the UWM classes, other professional opportunities, holiday activities, and assessment preparation materials.
- Memos, memos, and follow -up memos to keep opportunities on the table and to refresh everyone on MUSI goals worked for me.
- In general I was working to develop a level of trust with the teachers so they would want to work with me. I made as many interesting opportunities available to them as I could. Once they were connected and involved I found it easier to find opportunities to work with them. For example, teachers from each school went with me to a seminar on cooperative learning in math. Then we went back to the school and presented what we learned to the other math teachers.
- I compiled seasonal math science activities. This was a great point of contact.
- I offered to help with a group of students as they were working on a project or activity.

Ask to come into the class and do one thing.

- I offered to teach a lesson on a topic that was being taught in the classroom.
- When there was a science lab in the building, I offered to do a follow-up lesson in the classroom.
- Innocently showing a high interest video segment of another class doing an exciting project worked. If the teacher doesn't buy into doing the project, the kids' excitement almost forces the teacher into the project. I also did this with enlarged newspaper pictures of kids from other schools doing neat activities.
- I did mini-lessons in classrooms as a test to get teachers and kids feelings about a possible future project. Guess what! Many of the classes started the projects themselves. The teachers liked these projects and the simplicity and the kids like them too. Many people are looking for simple, understandable ideas.
- I asked the teachers if I could come into the classroom in order to assess the student's math portfolio work.
- I discussed with the teacher aspects of right/left brain learning and obtained permission to work with the students on these aspects of learning.
- Working with one grade level at a time has been very successful at one of my schools.

Other

- Another strategy was to get teachers to adopt some new curriculum materials and then work with them to implement the new curriculum. It was a good situation because neither of us knew much about the curriculum so we both learned about it at the same time.
- Working with one grade level at a time was very successful at one of my schools. I met with them at their family planning time. Then team taught with them for one week and continued to informally meet with them. One grade level took some initiative to observe each other and share new strategies they were trying in their classroom.

- Worked on gaining extra funding to set up programs for the schools in math and science.
- Gave teachers ideas in a non-threatening manner.

PARTICIPATE IN ACTIVITIES WITH TEACHERS

Getting involved in meetings and professional development opportunities alongside teachers from the schools was another common strategy. The MSRTs attended staff meetings, school committees, and special projects with teachers. This allowed some MSRTs to also seek out and begin working with leaders in the school. They also participated in UWM/MUSI courses and other inservices with teachers. The following three themes and comments provide examples of how some of the MSRTs participated in activities with teachers.

Participate in staff meetings, join school committees, and work on special school projects.

- I used staff meetings as an avenue to talk to all teachers. Some topics have included: What is MUSI? What is in my classroom that will help my students prepare for performance assessment tasks? What successes and challenges do I recognize in math and science? What is on the WSAS test?
- I tried to set up classroom events that involved the use of math and science skills. Then I asked teachers to participate in those events through team teaching. I worked with those who were willing to work with me and hoped they spread the word to others.
- I attended meetings of families during common planning time and department meetings.
- I gave mini-informational sessions at staff meetings or on banking day. This lead to entries into some classes.
- I identified myself and outlined the project purposes to staff and administration at departmental and faculty meetings.
- Being thought of as an essential component of the staff by being asked to be a part of the School Effectiveness Committee provided me with entry into the process of establishing policy and plans for the building. They asked me for my advice.
- I attended unit and grade level meetings, and offered assistance when possible.
- I worked on projects and committees with many teachers.

Seek out leaders and key people.

- I sought out the leaders in the building and worked with them first. They then helped me gain access to others.
- I worked with the program implementor and she made introductions and suggestions.

Attend UWM/MUSI courses or inservices with teachers.

- I worked with teachers who were engaged in the MUSI classes from UWM. I sought to find out what they were learning and asked if we could try some of the activities in their class. Some teachers shared student work with me after implementing a new strategy they had learned from the course. I always took time to look at the work and connect the work to the national standards and why this type of student work is so good for kids.

- I went to courses and inservices with teachers. This was very powerful since you could share and react to what was learned and then together plan a follow-up together. It also allowed you to get to know the teachers in an out of school atmosphere.
- I facilitated a portion of the UWM course. The existence of this course helped enhance the development of the district community of learners. Participants were being asked to incorporate standards-based instruction into their teaching, and then reflect on their experiences with other teachers from throughout the district. The discussions centered around science assessment that was spirited and thought provoking.
- I attended workshops and informational sessions with teachers.

BE ACCESSIBLE AND BE A GOOD LISTENER

Teachers' and administrators' lives are generally hectic. Thus it was important for the MSRTs to be accessible them. This often meant being available at various times and in various places for informal and unscheduled interactions with teachers and administrators. Being accessible was important, but equally important was then being a good listener. Someone that could be a friendly sounding board as well someone with ideas, suggestions, and encouragement. The following two themes and comments provide examples of how some of the MSRTs made themselves accessible and worked towards being good listeners.

Be available at various times and in various places.

- Another approach that has had some mild payback was arriving at school early and walking the playground and chatting with the duty teachers and the students before school started. Just before the bell a good number of teachers come out and I could get a lot of scheduling done. I discovered teachers and students interests and could provide resources that meet with their needs.
- I put out a contact sheet that I encouraged teachers to fill out if they wanted to work with me on a specific day. That has led to some collaborations.
- Posting times that I was available on the teacher key case had some positive results. This gave me times to get into the classrooms and gave me a chance to get the students going in science, and then talk and work, at least briefly, with the teacher.
- I tended to find something to do near the key case at the end of the day and during lunch hours when teachers checked their mailboxes. This had been a great avenue for teachers and myself to engage in conversations and set up appointments.
- I made the effort to walk the halls before and after school. This was an opportune time to just talk to teachers. A time that could be used as follow-up conference time from working with a teacher.
- Most of the time, I attempted to develop a rapport, which makes the entry part of the natural process. I ate in the lounge, shared things about myself, and listened to other staff members—these were important in establishing a relationship. Once that occurred, we discussed their classes and how we could work cooperatively to make their teaching and students' learning more successful.
- I walked the halls. When I heard a math or science activity in progress, I would poke my head into the classroom and usually the teacher invited me in.
- I always had lunch in the teachers' lounge.
- I asked teachers if they had any class projects or curricula they would like to develop. If they said yes I asked if there was any way that I could help them with the development. One teacher was interested in developing a science unit on glues and I

collected some related articles and one curriculum project as background materials. Another strategy was to make my rounds and be visible. I would ask teachers how things were going and fish around for ways to get involved with them.

- I sent out a form allowing teachers to state what workshops they wanted, if they were interested in team teaching, and if they needed assistance in gaining additional materials.
- I went in before and after school and made contact. Then after getting to know something about what the teacher was teaching, I tried to find a resource, an activity, an idea to support whatever the teacher was doing. This sometimes worked.
- I tried to be accessible, friendly, and helpful, and to be seen and known as a teacher.

Listen, talk one-on-one, be a sounding board, be friendly and empathetic, and offer encouragement.

- Friendliness and concern helped me get into classrooms for a first view and helping students got me in for a second and third time.
- I was aware of teacher planning time and used this time to my advantage. Just stopping in and showing my face encouraged teachers to engage in conversations. I always listened, recognized what they were doing, and maybe offered an idea or asked a question that enabled a teacher to reflect on their teaching strategies. I was very aware of body language to be sure my face and tone of voice showed no judgment. I constantly worked on developing my rapport individually with teachers so a professional relationship could develop. I recognized this as my responsibility to talk and to listen to all teachers at their comfort level. If I did a good job at this, then usually I was invited to work or support this teacher.
- My main strategy was to talk with teachers, talk with them, talk with them. They gradually felt more comfortable and shared insights and needs. I did most of the visiting one-on-one, since there were not enough meetings at either school that get the math and/or science teachers together.
- I listened to teachers' concerns and I was a sounding board for their ideas as well as a conveyor of information about professional opportunities. I was an encourager.
- Active Listening. I use parroting and paraphrasing with teachers and administrators. It showed them I was listening and it helped prevent miscommunication.
- Unconditional Positive Regard. I went in believing everyone can be successful. If I didn't believe it, the teacher wouldn't believe it either. Why does it matter? 30 children x 10 years = 300 children impacted by one teacher and that's conservative. I tried to find a way to reach all teachers and it all started with accepting them for who they were as individuals.
- I showed concern for people, not just math and science. I made sure that I visited the lounge during the lunch hour and conversed with staff
- Convey Empathy. I related personal "I've been there stories" when appropriate. I was very careful not to over use this strategy.
- I often expressed "We're in this reform effort together." Teachers, make that most humans, like to know they are not alone when venturing forth into the great unknown. There's power in numbers.
- Express my beliefs. Teacher's responded favorably when I spoke my mind on educational issues. Showing passion for one's work can impact working relationships. As always, moderation and timing of the use of this strategy was important.

Other

- Assisted on field trips, got together to eat lunch, worked on grants—basically using any opportunity to connect with various teachers so they got to know me and have a better understanding of what I could and could not do for them to increase the achievement of students and make their jobs better.
- I stated my strengths and weaknesses and offered assistance whenever they feel they can use it.
- Let's review what worked for me: Be seen! Don't be pushy! Be patient! Wait for teachers to approach you. Keep smiling! Follow up on the smallest requests. Communication is important. Understand what is expected of you. Demonstrate lessons. Compliment teachers on their individual styles, classrooms, etc. You will be invited back and they will celebrate your successes with others.
- Reminded teachers of my role and mission. I used every meeting (individual and group) to remind staff of the MUSI mission and my role. I also stressed that I would only be at the school for two years, so I expected my interactions to have a lasting impact.

CHAPTER 6

MSRT AND PRINCIPAL ROLES IN SCHOOL REFORM

Although there was no specific question asking the Mathematics/Science Resource Teachers (MSRT) about their roles in the schools, some offered comments and reflections throughout their reports describing how their role was perceived by others within their schools and how they perceived themselves in this new MSRT role. They described how they have successfully or tentatively made first contacts and inroads or have encountered speed bumps and roadblocks. Some have had to re-focus their approaches to teachers and administrators. Others have had to rethink and revise what they feel is necessary to bring about change.

Some MSRTs compared their successes, large or small, in one school with lack of any disposition to move forward in the other. Some MSRTs have developed a personal criteria for assessing the effectiveness of their own activities within their schools.

Also imbedded in the MSRT reports are a number of observations regarding principal support for the goals of the Milwaukee Urban Systemic Initiative (MUSI), for mathematics and science teaching and learning, for the work of the MSRT, and for change. These comments, when assembled, reflect just how important the principal was in providing a platform for change and the supportive scaffolding necessary for school-wide reform.

The remainder of this chapter contains representative observations made in the MSRTs reports. First are comments regarding the MSRT role. This is followed by comments regarding the role of the principal.

REFLECTIONS ON THE MSRT ROLE

- I find the freedom to make decisions about my use of time professionally rewarding and a unique experience after responding to bells for many years. I appreciate the trust from both principals and the MUSI administrators that I will use my time to promote the MUSI goals. I make my decisions with these goals in mind. I use a mental check list and answer these questions: Will this improve academic achievement for all students? Does this have potential for systemic impact? Will this improve the situation at one or both of my schools? I am focusing my efforts on the big picture and trying to avoid creating any dependency on an MSRT by involving others from the school in the processes. For example, at one school I was reluctant to organize the administration of the science assessment because who would assume that responsibility if I had not been there or when I leave? Circumstances there required me to do this. At the other school, continuing to work with the math committee to survey students and use assessment results to change instruction, I can facilitate the process and help establish an ongoing process that will continue beyond the MSRT.

- It is becoming clearer and clearer to me that for reform to occur, a school must be constantly dialoguing about expectations, strategies, and overall curriculum for students to be successful.
- I have met both open acceptance and guarded avoidance. Some staff members appear to question my presence and are concerned as to the evaluative potential. In those classrooms where I have been involved, I feel there is not a concern about why I am there. The students are very accepting and seem to enjoy the challenges given to them.
- I see my role in very different ways in each of my schools. I see myself as a resource and as a coach/supporter in each school. But what it looks like is very different as the needs of the schools vary.
- At one school I work very much with individual teachers as the school has not chosen to focus on math and science. While at the other school, the entire focus is math and science, so my role has been to include school-wide reform and curriculum alignment in addition to working with individual teachers.
- Comments I hear from teachers tend to be more about making up materials for them, taking a small group aside to work with, or taking over their classes so they can go do something else. None of these solutions would meet the MUSI goals other than make the teachers like me. They say they don't have the time to meet with me and as the structure of the school is at this time, it is true. I have made small steps in getting change to happen in this area. Every two weeks I will have one of the planning times to meet with teachers starting second semester. This was arranged with the principal in such a way that the principal will not give a different assignment for the teams to be doing and thus free up some time for the teachers to meet to talk about math and science plans.
- I believe that it is important that I have been able to involve people other than just the mathematics and science teachers. In one building almost all the staff are involved. In the other, people other than math and science teachers are beginning to stop me and ask questions.
- I feel the teachers want me there, but I'm not sure about my role with the science people—partly because I'm not as sure of myself with the science standards as with the mathematics standards. I don't know what an effective science classroom looks like.
- There is no continuity in the teaching of math. At one grade level, teachers are in the pilot phase of the Connected Math Project. Because of the pilot program along with the fact they have the tightest handle on classroom management, they feel they have no use for an MSRT.
- A total of 16 days over a three month period is not much time. I have extended a huge amount of energy and feel like there is little to show for it. I have not interviewed all of the teachers. I have little feedback if the things I have provided them are useful. Only one teacher has invited me to come to his classroom anytime. However, the teachers are friendly and will visit in the halls or when I visit their classrooms. I see the needs of the teachers and students and don't yet have the forum to influence school-wide change. (This school) has much potential and I feel in time will progress toward the MUSI goals.
- I am most frustrated by not being able to communicate with teachers in a meaningful way or for any length of time about curriculum, instruction and assessment. I know the pressures of their job and realize that my concerns are not a high priority with them. They need to be in classes and attend meetings and go home to rest and be with family.
- Some days I feel like I am not getting much done. Then I realized I have only been in this school for 24 days of the last three months and think that maybe I have

accomplished something. I am most pleased with the project to use assessment data to adjust curriculum. I feel this has opened the door and may lead to important changes. I am also pleased to have science teachers involved in several professional activities that they otherwise would not have known about or would have put off without the personal contact. I can see the work to be done and have a long way to go.

- The point of contact is not my difficulty. Going beyond that point is more difficult to me. I have concerns about how best to motivate teachers to change. Hearing what should be done is not the answer. Each person interprets what has been said or advocated in a different manner. So we can see teachers who have been inserviced on reform concepts changing very little of their classroom practices. Some change only as much as is needed to have the students comfortable to take the proficiency tests. Some think changing materials is practicing reform. These are only starts to change, and not the acceptance or need to totally rethink what is, or should be done in math/science, or why.
- Some days I come home feeling like I have made a difference in my schools. But on many others, I feel like I am making little difference in the lives of the students. Classroom teachers are so important and I wish I was better able to convince them of their importance and that of teaching math and science. My frustration came when a teacher did not do the assessment and nothing was done about it.
- One school's administration and staff have gone out of their way to make me feel welcome and to include and involve me in their classes, school activities, and after-school functions. The administrative support at this school has been excellent, ranging from announcement of my appointment to the staff and making arrangements for my attendance and participation at staff meetings to offering funding for MUSI related activities. The other school mathematics staff, as a whole, could be more supportive of the MUSI program. Only the STW coordinator, the Title I coordinator, and the science department staff have been the major supporters of my activities and have provided opportunities for my involvement in the school program.
- I am constantly busy in both of my schools with a number of teachers, activities, and students. But of all the requests that I have, it is still the students that continue to keep me moving in a positive direction to help teachers and students understand the need for an inquiry-based, content-rich, relaxed, and fun classroom.
- I wondered and tried to think of ways to get science going. I listened to some other MSRTs talk about how teachers were not seeking their counsel and how they were having trouble getting things going in their schools. They talked about teachers not letting them into the classroom. Based on this, I decided on a plan to move science into the classrooms of my schools. Because I saw much more of a need for science than math, my target was science. But, my plan included a pledge to myself that all my activities would have a significant math component. I became the conduit for getting science to start flowing into the lives of the students. I created hands-on, minds-on, content-rich, assessment/standards oriented, fun student activities, and I took these activities into the classrooms. At first there was teacher hesitancy. But when the word of my success got around, I was swamped with teachers and kids asking to do science. Teachers started to complain to me about their kids not getting their fair share of science. Other teachers went to their learning coordinator about how I'm not getting to their classrooms as much as other teachers' classrooms. A principal complained that her school was "not getting its fair share" of my MSRT time. There is not enough of me to go around. My challenge for the next five months is to wean the teachers from expecting me to do the science and convince these teachers to start doing some simple, basic, data gathering, problem solving science on their own.
- Writing this report provides me a means to summarize and analyze the work I have been doing and determine what I need to do next. Sometimes as I engage in the crisis

at hand, I lose sight of the big picture. I can visualize the MUSI goals and know how the components work together to accomplish these goals. I have not directly communicated this to the people at this school and I'm not sure this is the time to do it. I have a better understanding of where they are at and what needs to be done. I am beginning to realize that when Cynthia says, "We need to change the hearts and minds of people," she is absolutely correct. I can encourage professional development, I can offer to assist, I can provide activities, I can etc., etc., etc., but there needs to be a willingness on the part of the teacher to improve education for the students. The situation at this school will not be "fixed" in a hurry. I must use all my patience and assume nothing in this situation. This presents a big challenge for me. People are friendly, but I am still an unknown factor and not totally trusted. I have met open opposition to the hands-on approach. As a classroom teacher and active in science reform, I was surrounded by like-minded people. Now, I am challenged by the opposition or by people who do not see education from the same perspective that I do. This is where I need to use patience.

- My plan is to work with those individuals who are most receptive and hope that academic improvements for their students can be measured and used to convince the others to consider making adjustments in their instructional methods. My plan is to continue to encourage professional development where teachers can listen to educators beyond their school and discuss what is important in education and the achievements of their students. My plan is to work with the teachers when in committees to accomplish something when they are together and plan for success. My plan is to challenge the teachers when the results of the district science assessment and WSAS are returned to make adjustments and develop a plan for improvements. The data will give us something concrete to discuss. However, right now, everything is perceived as "just fine."
- It might seem strange to include this under the "classroom Section" but in subtle ways MSRT visibility/accessibility does impact the classroom. Many students express genuine enthusiasm regarding science when they see me. They often say , "When are you going to work with our class again?" in front of their teacher. Comments like those serve as testimonial to the value of good science teaching. A teacher has made comments indicating that she notices how much the students enjoy science when we team teach. I serve as a walking, talking reminder of science and math reform. I've even had some teachers walk up to me and before I can say, "Hello" they confess that they have not taught enough science or math lately. I'm glad they feel a sense of shame. They should. And be assured I take the opportunity to get them to commit to doing a lesson or two!
- Two schools keep misplacing orders and making excuses for not ordering supplies. I sometimes doubt if they really buy into the idea of having hands-on, minds-on science in their schools. In no case have any actual supplies reached any of my schools. One school secretary has serious doubts about getting delivery of the November orders before Spring break, which is two months after assessment. Where are the kids going to get the tools to do the assessment activities?

REFLECTIONS ON THE PRINCIPAL ROLE

- The school has a committee structure which includes both a science and mathematics committee. Teachers and educational assistants are members of the committees. These members often have a strong background in an academic area and can help to impact upon the rest of the staff to bring about change. The principal is very supportive and takes a strong leadership role which the teachers respond to positively. This is a large staff and there is a broad range of instructional styles.

- I share activities along with student work samples with the principal. This provides a common language and clearer vision of the MUSI initiative. It also gives the classroom teacher recognition for his/her efforts in connection to this initiative. A goal the principal and I have established is to create a resource library for the teachers that is easily accessible.
- Movement on a school level is more difficult than with individual teachers, but when the principal is supportive and has the time to meet with teachers and the MSRT, it seems as though the change is easier.
- A real breakthrough came at the end of the month when the principal asked me to lead the teachers through an examination of curriculum to align it with the WSAS tests given earlier this year. This is an opportunity for systemic change and to meet the MUSI goals. The alignment of curriculum, instruction, and assessment is a plus in making gains in student achievement and narrowing the gap. I was very pleased that he contacted me with this project.
- The administration is sensitive to the need for change and is very supportive of my presence. The principal has included a math initiative in the school's selected report card activities of the 1996–97 school year. As a result, the math committee has developed an assessment that was given to all grade levels. The results will be used to target specific skills and strategies for the year. In spring a post assessment will be given to assess any change in student performance.
- The current principal did not attend the Principal's meeting held at the Cosmic Center, nor respond to the make-up meeting. Consequently, I entered the building with the task of introducing MUSI and the role of the MSRT to the principal. I was well received, but there were no preparations for my arrival. This has resulted in slower progress in this building when compared to my other assignment. This is not intended as a negative comment; merely a statement of fact which may influence the preparations for second-wave MUSI schools.
- The principal attended the Principal's meeting held at the Cosmic Center where he explained some of the intentions he had regarding MUSI. He obviously had given the Project considerable thought and was prepared to meet the MUSI goals, probably because they were consistent with his. When I first arrived at the school, I was warmly greeted, provided a small office, and taken on a tour of the building by the principal, who personally introduced me to the teachers. I believe this approach sends a clear message to the staff of support for the MSRT and MUSI.
- The committee structure and use of planning time are weak at this school. There is a lack of common vision. The staff are very nice people, but appear to be functioning from a social level and not engaged in professional pursuits as a team. I have not shared this observation with anyone. From my regular meetings, I know the principal has a vision for the school. I am watching how the principal communicates this vision to the staff and if and how the team building that is needed is accomplished. The principal intends to move slowly.

CHAPTER 7

MAKING PROGRESS ON THE JOURNEY

The journey during this first year of the Milwaukee Urban Systemic Initiative (MUSI) included a variety of paths taken by different Mathematics/Science Resource Teachers (MSRT) and teachers in MUSI schools. Chapters 3 highlighted the similarities among the paths, whereas this chapter presents some of the unique excursions taken by specific schools or individual teachers.

For the final report, the MSRTs were to write a few paragraphs about how they helped one of their schools make progress in improving mathematics and science teaching and learning. Then they were to also choose a couple teachers they had impacted during the first year of the initiative and describe how they had helped the teachers to change.

ONE SCHOOL AT A TIME

The MSRTs furnished samples of progress that included both what had occurred during this first year and plans that had been put in place for the following year. The examples illustrate the many different approaches that have led to change or progress toward change within specific schools. Their descriptions included:

- encouraged teachers to attend conferences and classes;
- helped secure funding to set up science rooms and labs;
- assisted in pilot programs with support and inservices;
- used grade level and department meetings to encourage staff communication, collaboration, and cooperation,
- aided staff in identifying areas of concern;
- leveraged or secured funds for mathematics/science programs and staff development;
- assisted with assessments; and
- created awareness of mathematics and science student achievement issues.

Developed a focused approach to implementing the MPS core science units.

Science instruction will be emphasized in the 1997-98 school year with the infusion of the content and core units of study at both schools. In preparation for this, the science room at one school will have its schedule changed to reflect a more concentrated time of study at each grade level. At the other school, the designation of a math-science person to work with grades 1–3 and the teaching of science as a part of the daily rotation of the fourth and fifth graders will be used to address the concerns raised from the feedback on the assessments.

Restructured how students are scheduled to work in the science lab.

The science lab at one school will be restructured next year. Instead of the science teacher working once a week with students, he will use a block-schedule to meet student academic needs. Every two weeks, a different grade level will be scheduled for classes in the lab. These classes will go to the lab every day for one hour for a two week period. The teacher will stay in the lab and team teach with the science teacher during this two week session. They will use the science kits. They will teach science content as well as process skills. This will help the classroom teacher gain expertise in understanding how to integrate content with process. The classroom teacher can also extend the unit following the two weeks if needed. The school will have in place a systemic approach to teaching science. I, as the MSRT, will support the planning, implementation, and assessment of science units with teachers as well as with the lab teacher.

Developed plans to pilot the TERC Investigations program in mathematics.

The school will be implementing the Investigations program developed at TERC for math at each grade level next year. We will begin our support for this program with staff development in June. The new program will help by providing teacher resources but the staff development will support teachers as we begin to look at our teaching strategies and our role as teacher in the effective math classroom. Staff development/support for this program will be ongoing throughout the year. We will use money for substitute teachers twice a year. The subs will release the classroom teacher to work with the principal, the implementor, and myself (the MSRT) to discuss our language arts, mathematics, and science curricula.

Infused technology through a Goals 2000 grant, *Forward with the TI-83.*

Progress has been made to improve the mathematics program in one of my schools through the Goals 2000 Grant: *Forward with TI-83*. The grant allowed the school to purchase one overhead graphing calculator, 62 TI-83 graphing calculators, and ten workbooks. It also allowed us to hold four teacher workshops totaling twelve hours. Teachers were trained in the use of the graphing calculators by a fellow MSRT. *Forward with TI-83* was the catalyst to implement a six area evaluation system of the mathematics program and student achievement. There was a commitment from the teachers and principal to continue this evaluation system for several years. Data-driven decision making will become the initial work of the mathematics committee in the fall as we focus on analysis of data from a student survey of grade 7 and 8 students, analysis of district and state assessments, surveys from grade 9 and 10 students, observations and interviews of students, and the review of student portfolios. Evaluation of the mathematics program and student assessments was the logical step for these teachers since they had instituted the Connected Math Project (CMP).

Developed a special preparation class to target the achievement gap.

At the high school, the staff perceived there was a serious need to prepare students, especially students of color, to develop test taking skills that would enable them to utilize the scientific method and other critical thinking approaches to obtain qualifying scores on the ACT/SAT college entrance examinations. It was clear that non-black students were enjoying a disproportionately higher measure of success on these standardized tests than were students of color and, in particular, African-American males. Accordingly, an instructor developed a course of study with input from the guidance staff and the mathematics and science departments that was designed specifically to address these identified needs, especially in the areas of critical thinking and higher level thinking. The guidance department launched a special recruiting effort that was specifically designed to identify, recruit, and support the target population for this program, and several sections of students, broadly representative of the school district's diversity initiative, were enrolled in the class. Unfortunately, the school lacked the financial resources that this course required. I was able to secure adequate funding to underwrite the necessary start up costs of this program which will be offered during the 1997-98 school year.

Allowed students to learn beyond the classroom through the study of hydroponics.

The Riverine/Marsh Survey program at the high school and the hydroponics lab activity conducted at the other school both had successful conclusions to their annual activities. Students from one school traveled to selected sites in the Menomonee River basin and the Horicon marsh and collected a wide range of scientific samples and measurements which they were then able to study. The impact of this project upon student learning was incalculable, especially in the amount of information they collected and evaluated regarding this environment in which they live and in which they will work in the future. I was able to participate on the field trip and see firsthand student enthusiasm and their realization that the theoretical learning of the classroom had a real impact and use in the real world. In a similar fashion, students from the Hydroponics Project were able to travel to a business that produces vegetables for sale at a profit based upon the very hydroponics principles that they had learned and were applying in their classrooms. Once again, the point was made abundantly clear that their learning experiences in the classroom could be directly applied to aspects of their own lives in a positive fashion. The excitement of the students on the bus was a distinct measure of their approval of what they had seen and what they were doing. Incidentally, both of these projects were funded by MUSI/Goals 2000 grants!

Conducted pre- and post-assessments to examine equity issues.

The school has achieved an awareness of making progress on equity issues. Part of their school plan for this past year had to do with looking at the achievement of both black and non-black students at the school. To show progress, a pretest was done in fall and the test for proficiency was done in March. The pretest showed the students very close together in scores. The actual test showed a "gap" that was very large in some classes and closer in others. Most students improved as shown by the data left at the school. It is interesting to note that during November through February, the learning showed a disparity between the black and non-black students. The question is why. The students all heard the same thing in the class. Another issue was the small number of non-black students in each of the classes. Would more non-black students make the gap greater or smaller? Is it statistically accurate to compare the scores of 25 students to the scores of five students? I have tried to create an awareness of the problem of the gap and to offer some suggestions as to how to develop standards-based, inquiry-based, content-rich lessons. Rich materials (a new mathematics pilot program) were provided, but the teachers have a difficult time adjusting to the new way of perceiving the pedagogy needed to use these materials. I have tried to be a motivating voice, encouraging teachers to give the new pilot a fair shot. I have planned inservices and conducted several workshops on the material. I have asked Central Services to sponsor a three-day workshop prior to the start of school in the fall, with a teacher - practitioner to conduct it.

Scheduled regular meetings of the mathematics and science departments to focus school efforts in these areas.

At one of my schools I helped to get the mathematics and science departments to meet on a regular basis. When I first got to this school neither of the two departments met regularly. At those meetings people began to talk about matters related to teaching, such as what curriculum should we be using, what should we make of the TIMSS report, and how can we coordinate what we do across and within the grade levels? It is a slow process and teachers are very busy, but a start has been made. Also, at that school we obtained a Goals 2000 grant that brought in some very solid physics equipment. I think next year that equipment will be a pivotal part of the science program at that school. Teachers are excited about using it and I am anxious to work and learn together with them. The school also bought a lot of graphing calculators at the end of the year. I did one inservice at a meeting near the end of the year and teachers seemed very interested in learning how to use them. I am very encouraged by teacher interest and think the calculators will be a tool around which a lot of learning will take place. Finally, the teachers at this school have agreed to loan the physics equipment to teachers at my other school. I hope that leads to ongoing collaboration throughout the year. Teachers from both schools are going to attend an inservice on how to use the equipment which I hope will generate excitement and an interest in using the it on a regular basis.

Developed plans to pilot new mathematics programs—TERC Investigations and Connected Mathematics Project (CMP).

The middle school math teachers at the school have agreed to implement the CMP program next year with my assistance. The principal has ordered the necessary materials and summer meeting times have been set for planning. TERC materials have also been ordered for all grade levels 2 through 5. I have a selling job ahead to get all teachers comfortable with the new approaches, but I am confident teachers will embrace the program.

Established a blocked science program and special time for science projects.

At one of my schools I worked with the teachers on science standards and performance assessment. As a result of the interaction and increased awareness, the science resource teacher tried a block schedule as a pilot so she could address the various standards and create a better learning environment for science. Teachers remained with their classes and thus gained from the modeling of this process. From this pilot it was decided to go with this block science program. In addition, a plan has begun to have a special time on Friday when teams of children interested in science would do special activities, prepare for competition, etc. This will allow these children to become models for the rest of the class and to assist as models during regular science classes. Though this interaction a community of learners will develop among the students.

Established a science buddies program to provide support to targeted middle school students on science performance assessments.

In one of my schools there were a number of seventh grade students who scored 2 or below (on as scale of 0–4) on a trial WSAS lab experiment. The teachers gave me a list of those students' names and I obtained some students from a high school in the area and worked with these high school students on how to help the middle school students understand how to read a graduated cylinder, weigh mass, compare and analyze results, and clearly write their findings. With the help of the high school students and the cooperation of teachers and principals from the two schools, we worked with the identified seventh grade students in the science lab. Through our efforts the students were retested with results of 85% of the retested students scoring a 3 or 4. These results helped the students and also helped the school obtain quality points for the school's accountability. I then met with the teachers and worked with them on different teaching strategies to experiment with to reach high achievement for all students.

Established school-wide mathematics portfolios.

One of my schools started the year by having the students keep mathematics portfolios. Some of the teachers had received no inservicing on portfolios. I met with the sixth, seventh, and eighth grade mathematics teachers and we discussed and shared ideas on what is a portfolio, what is its purpose, what should be contained in the portfolio, and how to make the students accountable for their own portfolios. Throughout the year I reviewed the students' portfolios and gave the students and teachers feedback on the portfolios, and at the end of the year I made sure that the eighth grade portfolios were taken to the feeder high school for the ninth grade teachers to maintain for the students' high school years.

Developed plans to pilot the Math Trailblazers programs.

I have encouraged and supported the staff as they began to pilot the NSF-supported Math Trailblazers. This decision was made after the staff became concerned about accountability across the grades. They were eager to have a consensus as to what grade levels were responsible for what content. In the past, the K–2 teachers had not adopted a textbook. Teachers were trained in Math their Way and CGI. There has been a staff turn over and many brand new teachers were hired who were not trained in either philosophy. It seemed advisable for the new teachers to have a curriculum to follow. Representatives of three publishers presented their curriculum on a banking day. The staff took great care in their selection. The Trailblazer curriculum was selected because of its integration of science and language arts with math. I attended the initial training and worked with the consultants and school personnel to plan a more intensive inservice for June and August. I wrote and received Eisenhower funds to support this project. Next year, I will support the teachers as they begin to pilot this math curriculum.

ONE TEACHER AT A TIME

The MSRTs described some of the ways they felt they were able to help individual teachers improve their mathematics and science instruction. The examples illustrate the different approaches used by the MSRTs .

Encouraged a teacher to become more involved in district activities.

A sixth grade teacher has become more involved in district activities. She scored math and science assessments. She joined the middle school council and was active in selecting middle school math materials for next year. Approaches to gain confidence were to demonstrate lessons, visit the room often, establish a focus group to center discussion on math and science, and be a good listener and sounding board for their ideas. I have also found that the middle grade teachers (in a K-8 school) are frustrated in the perceived lack of interest given to them by the district. They want to be more involved and be a part of the middle school "group." Also, the fourth and fifth grade teacher who teaches science has begun to use a more inquiry approach in her teaching and is actively involved in the forming of next year's plans in Science.

Supported Project Science Teachers.

I have impacted the teachers from both of my schools that are participants of Project Science. This was my vehicle for working with teachers to bring about systemic change in science using a small committee of teachers. In Project Science we met as a large district committee and as a school-based performance assessment committee. We learned to use science assessments to guide our instruction. As our learning developed we realized the need to share what we were learning about science curriculum and assessment with the staffs at our schools. This science committee will facilitate the first two banking days of the 1997-98 school year to work with teachers' understanding of how to integrate science content with process skills. During our substitute release conference days we will meet again to share evidence of student work and to share teaching strategies.

Focused efforts of a grade-level team.

The first grade team of teachers is on the road to change. I organized staff development geared toward their needs and attended the workshop with them to develop rapport. I followed through with strategies from the workshop and modeled lessons. We then met as a team to discuss student learning during these lessons. These same teachers enrolled in the Sally Ride Academy for the week session of mathematics in the elementary classroom. I encouraged the teachers to view materials for a math pilot. A representative for from company came to the school to answer questions. We've ordered these materials and will use them to reflect on teaching practices in the classroom. Support, support, support was my impact.

Assisted teacher in using the MPS science kits.

A veteran second grade teacher asked me to assist her in using the kits early in the year. She had gone to the Kluge inservice and wanted to know more. I made it clear from the beginning that I expected her to do science on her own in years to come. We started planning a unit immediately. She often expressed that she didn't think her students could handle an active lesson. I acknowledged that it may not go perfectly, but I was willing to give it a try. I emphasized "we're in this together" and that taking risks was the only way we'd find out what works. From that time on we've enjoyed a very productive working relationship. She has become more confident using standards-based pedagogy and she sees real value in collaborative relationships. I believe her motivation to change was impacted because:

- I was committed to supporting her in science instruction in her classroom.
- I was persistent. I was always around to ask "How are things going?" • I didn't give up on her even when she didn't follow through on our plans.
- I showed a sense of humor.
- I was confident that she would see the value in doing standards-based instruction.
- Her students responded well to the lessons.

Helped a teacher gain confidence to teach more science.

A fifth grade teacher is a wonderful, kind person who has great rapport with her students. Although actually quite literate, scientifically speaking, she taught very little science, apparently feeling somewhat uncomfortable with doing so in the full class setting. By using simple ideas and simple equipment (fruit jars, eggs, white glue, toothpicks, sticky tape and tongue depressors) to do simple science in her classroom with her students, I allowed her to observe and check things out, take a few notes, and move closer to doing her own science. To gain her confidence I always wrote notes and confirmed my visits and activities. I took her class on a field trip for a day of nature studies. I now see her weighing, measuring, and operating much more in the hands-on and collecting data areas of science and math.

Assisted a teacher in re-thinking mathematics instruction.

A teacher had no formal training in how to teach math. From what I could gather she learned math in a very traditional way and did not like it very much. From the start this teacher was interested in learning better ways to teach math. She signed up for inservices, went to conventions, and was an eager student. I worked with her and tried to be encouraging. She felt very frustrated that many students were not successful so we experimented in her classes. I showed her how to use Algebra gear as an alternate way of learning about integers. It took her a while to learn how to use the gear but she persevered. I did not go in and act like an expert but made some suggestions about what she could try. We talked a lot and I tried to let her know that there were alternatives to the traditional ways that she was taught. I also told her that teaching is a very difficult profession and not to get discouraged. That seemed to help when she was feeling overwhelmed. Toward the end of the year she tried new ideas including ways to use cooperative learning to help children learn. She did an excellent job. I was amazed and impressed that she was open to so much experimentation.

Encouraged a teacher to become more involved in district activities.

I've worked with and encouraged a sixth grade teacher to become more involved in math activities at a district level. She took the UWM/MUSI algebra class and has taken a greater responsibility for the status of math at the school.

Assisted a teacher in re-entering the profession.

Another teacher re-entered the teaching profession in November, due to over sized classes in the school's seventh grade. He had no idea how to begin to teach today's students, nor what to emphasize with the students. I did some modeling for him for the first few days of his induction back to teaching. I also shared materials with him and touched based with him regularly. After a reasonable amount of time for him to adjust, I went to observe his class. It needs some more time yet, but progress was made, the kids were well behaved.

Building confidence to teach geometry.

A teacher told me that she was never very good at geometry so her confidence was not all that high. I spent two days per week with her and while I was there I did most of the teaching. I asked her if she wanted to take over but she would usually say no. I didn't push it because I didn't want her to get uncomfortable and embarrassed. The rest of the week she did the teaching and I think it went okay. We would talk about the lessons at the end of the day and had some good discussions about how things went and also alternate ways of doing things. Before the CMP unit she rarely allowed students to work in groups. When we did the CMP unit she had students in groups every day that I was there. That was a big change for her and signaled progress to me. Sometimes the groups were not given as much freedom as I thought they should have, but still progress was made. When we were done with the unit I think she felt stronger about her geometry knowledge and skills. She learned along with the students and I think next year she will approach geometry with more confidence.

Supported a grade-level team of teachers.

I worked with the first grade teachers. These teachers signed up for the UWM/MUSI primary math course. Also, the principal had allocated time each month for planning with the teachers and these teachers were willing. They asked for materials and I shared ideas with them. I praised them in the class, asked them to share their ideas with others, encouraged them to share in the fall NCTM literature display, helped them with their display, etc. They have now begun to incorporate writing in math, have incorporated multicultural math, used CGI problems, and plan together. Their classes participated in an internet project "Journey North" where the students traced the coming of spring by watching the tulips come up and recording this data. I can't wait to work with them next year. I want them to work with other teachers. It is time for them to become math leaders in their school.

CHAPTER 8

SEVEN EXCURSIONS

Several MSRTs included detailed descriptions of some exciting or disappointing events that occurred in their struggles to make a difference in just one short year. Seven of these stories are included here to offer snapshots of what was happening in the MUSI schools daily, over time, during this first year journey. They illustrate both steps forward and steps back along the road to systemic reform in mathematics and science. These stories reveal a certain resolve, in spite of failure or because of success, to keep working toward building capacity for change.

EXCURSION I

My interactions with the first grade team of teachers is an example of a rich experience. On Wednesday mornings this first grade team of teachers met together during a common planning time. Their discussions centered around children—the needs of their children, the progress of their children, and successes and frustrations in teaching in their classrooms. I joined a team meeting to listen to the interactions and concerns of the teachers. My interactions were at a minimal level—citing a few things I was doing in the building or answering questions. The following week I attended the planning meeting again and the teachers asked me if I could demonstrate a few lessons on money in their classrooms. We set a schedule and decided the format would be team teaching. I would teach a lesson with their support and the following day they would teach a follow-up lesson with my support. This format would then continue for the remainder of the week.

The skill we concentrated on in each of the four first grade classrooms was money. I prepared a beginning lesson that I would do in each room. Based on the needs of the children it so happened the lesson took a different twist in each room. This twist and the willingness of the teachers to discuss, reflect, and share is what made this a rich learning experience for all. I did not plan ahead of time with any of the teachers because I wanted to try a whole new thing with their children. I did not want them to think or share with me ahead of time how this lesson may or may not work. I knew all four first grade classrooms had wonderful management and that asking children to reason, problem, solve, and communicate as they worked with money would be a learning experience for all of us. As the children were doing their work from the lesson, the teacher and I checked them for understanding. We also used the last few minutes of the class to figure out what type of follow-up lesson the children needed for the next day. We planned the second lesson together as I knew it was important that the teachers were comfortable with the lessons they would be presenting. The rest of the week continued along the same path.

I managed to join the teachers in the lounge after the third lesson in the first grade classrooms. As in all teachers' lounges, many conversations were happening at once. Luckily, my first grade team was sitting together and naturally I joined them. I pushed for some reflections on what was happening in the classrooms. The teachers then realized different lessons occurred in each room They were interested and questioned each other on student learning. I also observed other teachers listening to the reflections we were discussing. I knew this would help me later on as I worked with other teachers in their classrooms.

It was two weeks later that my MSRT "present" arrived. One of the first grade teachers took the initiative to observe another first grade class during math to learn new strategies. They had taken the next step themselves and were becoming a community of learners—sharing and reflecting on student learning. The principal told me these first grade teachers were excited about what was happening in their classrooms. They cited the fact that seeing new strategies implemented in their own classrooms with their children gave them an opportunity to reflect on how all children were engaged and how these types of lessons provided all children the opportunity to learn. One of the teachers invited me back to do a lesson that I worked on in another room. This told me that teachers were discussing strategies and student learning when I was not in their building. They were reaching out for new ideas.

My goal in each room was to remove the children from filling out worksheets on money to constructing their own worksheets that would display their knowledge of counting money. This goal would provide the teacher with insight on student learning and teachers could use this feedback to guide their instruction. My goal was achieved because of the excitement in the eyes of the teachers as we discussed the papers from the students. They knew exactly what students could be enriched and which one's needed to be strengthen. They realized how much more thinking the children were doing. They realized how all children were engaged. They even cited that students who were usually off task were answering questions and doing work. They were so proud of their children and I was so proud of them. After a month had passed from this experience, this team was still reaching for new strategies and inviting me into their conversations. As of this writing, I am working with the third grade team and, as all good news does spread, the first grade teachers had talked with the third grade teachers, and I hope this too will turn out to be another success story. One can never tell.

EXCURSION II

After being introduced to the mathematics and science teachers at this school, one teacher in particular, new to the building and the system who had been given a special program (Title 1 funded) requested help in the form of materials and ideas for helping students identified as "gray area." This seemed to be a good entry. I was received in her classroom and was able to observe and work with her small group of students. Her emphasis was basic skills and it was done in an arithmetic framework. She said she used journaling—a notebook in which students did a word problem, such as "If pencils cost 25¢ then how many pencils could I buy for $1.75?" I began to investigate options for materials as well as approaches which I felt fit more into the MUSI guidelines. I found an array of upper primary resources, TERC materials, low stress algorithms, and the NCTM addenda materials. I also began investigating how the CMP pilot project was being implemented at the school, since I was told that the sixth grade level books may also be some help to these students.

Armed with these options, I went back to the school and thought that these materials might become a springboard. What I found was a very befuddled teacher who was extremely stressed and felt that she was being put in the middle. She felt that the approaches that I had offered and the suggestions made were antagonistic to the goals which were given to her—that these students pass a test of basic skills given by the school psychologist. I backed off.

This narrative could continue, describing a perceived inroad followed by two steps back. I stop on a positive note, however. I returned to this original classroom to regain trust and rebuild bridges and was able to model a lesson involving groups and a non-traditional investigative activity. We were able to debrief and use my demonstration as an example of how cooperative groups are very different from just groups. I have begun to dialogue with this teacher about questioning techniques and responding to questions. The work continues and while this young teacher has begun to investigate other curricula and pedagogy and has signed up for one of the UWM/MUSI course offerings, her classroom has remained somewhat the same. I hope that as she learns different pedagogy in the UWM class, that I can truly begin to facilitate her implementation.

EXCURSION III

I have worked a lot with the new seventh and eighth grade science teacher at one school and am impressed with her improvement over the last few months. She was a brand new teacher who had no background in science or in education (or with middle schoolers) but has a willingness to learn and a "try new things" attitude. Like many new teachers, classroom management is a challenge, as is teaching science. To begin with, it must be noted that she had the tiniest room in the school and often had to teach 30 students, ability grouped, with little or no equipment.

One of the things that drove her teaching was the upcoming seventh grade science assessment. I shared samples of performance-based assessments and this seemed to inspire her to try some of these experiments. She had not yet taken the step of having the students do individual experiments, but she had done demonstrations of science lessons and involved students during these demonstrations. For instance, she brought in three kinds of paper towels and had the students brainstorm what makes a good paper towel. They developed a list with items such as durability, strength, and cost. Then she had the students find ways to test how to measure the characteristics. Each class came up with an experiment to test their hypotheses.

My role was to observe her teaching and sometimes ask questions of the students that led to further questioning. I pointed out some of her strengths and asked her how she might improve the lesson. I planted a seed of an idea with her and helped her develop a lesson. But it was her job to teach the lesson and reflect on it. We talked a lot about the scientific method which is posted prominently in her classroom. She was moving ahead in her teaching. I couldn't do it for her. She has joined Project Science at the district level and is going to involve the seventh and eighth graders in the JASON Project.

How have I specifically helped her? I have given her choices and ideas in what to teach. I have provided her with resources such as AIMS and GEMS. I have met with her and listened to what she needed. I have been a cheerleader and supporter. I have been in her classroom every week to offer suggestions and to provide feedback. I have been empathetic to her plight... I too am learning about middle schoolers and science. I am no more qualified than she to teach middle school science. That's why in this case, I do not do demonstration lessons. I look forward to watching her grow in her profession. I hope to be there as a support for her.

EXCURSION IV

A performance assessment class was formed to network six MUSI Schools on a common need of preparing our students for the district-wide science performance assessment test. Teachers from both of my schools were represented and we also invited fourth and fifth grade teachers. This class was a learning experience with ups and downs. Participants wanted the concrete example. They wanted us to say, "Do this and your students will do well." They wanted the answer and were not interested in learning the process. When we asked them to look at science lessons from their kits and discuss the scientific process, we were pulling teeth.

They found *something* worthwhile because they hung in there and kept coming to class. At our last class, we discussed expectations. What did they learn? How do they look at a science lesson and begin to prepare to teach it thinking about the scientific process? Our discussions were rich and the format of the class was set so everyone participated. Ideas were exchanged and agreements and disagreements were discussed. We asked ourselves, "Why is this good?" Because we were now all talking science. We had the beginning, a point to start from. A rapport had developed and now more teachers wanted us to support classroom activities. This yielded more discussions which will add up to our goal of raising student achievement and closing the gap.

EXCURSION V

I was handed the task of organizing the administration of the district science performance assessments. Prior notice would have allowed me to organize this process in a different manner, but I did the best I could under the circumstances. The seventh grade teachers worked well together to make sure the assessment was completed, which was a positive signal. Again, this proved to be a valuable experience. I discovered there were few 30 cm rulers in the science department—a classroom set could not be gathered. Since there was the pressure of the assessment, I only asked myself what kind of a science program is going on here when there are no rulers to be found!? This indicator told me many things about the science teachers from their understanding of process science to their ability or interest in advocating for their students. It provided me with a better understanding of how to approach my work as an MSRT at this school. The first thing to be ordered were a classroom set of rulers for every science teacher.

EXCURSION VI

One powerful thing that has happened in MUSI was the university mathematics course being offered for participating teachers. Eleven teachers from both schools took the course. The course provided an opportunity for all of us to hear about the rationale for teaching activities in mathematics. We all tried the same activities and the teachers went back to their classrooms and worked with the children. I saw this as a way to have some common language and experiences to share. I was not taking the course for credit, but saw it as a means to make contact with the teachers.

One week, one of the instructors did an activity supporting basic facts and developing understanding of part/whole relationships called "Shake and Spill." A few days later when I returned to the school, a first grade teacher told me that she had gone right home that evening and planned to do this activity in conjunction with her study of East African magic squares. She had each child shake fifteen two-colored counters five times and record the combinations that shook out.

The UWM instructor had mentioned that a probability lesson could follow this, but the teacher felt that she did not have the necessary understanding of the concept of probability and how to graph it. What an opportunity for me to step in and make a connection with the teacher. I offered to come in that afternoon and work with her students on the graph. We had a great time. We graphed all the combinations for 15 reds and 0 yellows to 0 reds and 15 yellows. Our graph was great! And then the fun began. I led a discussion of what we could guess from the graph. If the other first grade did the same task, what number combinations might (would be more likely to) occur most often? What probably wouldn't happen very often. The conversation continued and the teacher started to understand more about probability.

The basic understanding was occurring because of the UWM instructor's comment and my being able to follow-up with the activity at the right time. I was in the right place at the right time. What are the odds of that? In the MUSI project, the odds are increased.

EXCURSION VII

I have finally made contact with some teachers who were ignoring me or shutting me out. The science lab teacher was a good example. I was very pleasantly surprised when I offered her support for the science fair and she accepted.

We (the faculties at both schools and I) are starting to get comfortable with each other and the many personalities involved. Trust is beginning to come about. Intellectually I knew change would not happen over night, but I still wanted—expected —the change to happen more rapidly.

I am becoming more comfortable with the "less is better" idea. I now am able to focus on one or two major areas at each school rather than trying to be everything to everyone.

CHAPTER 9

SUMMARY

To summarize the journey of the Mathematics/Science Resource Teachers (MSRT) in this first year of the Milwaukee Urban Systemic Initiative (MUSI), one needs to examine again the central goals of MUSI as well as the design, purpose, and responsibilities of the MSRTs. Responding to open-ended questions, MSRTs have provided through their narratives, a glimpse of how they, as a group, have established processes and strategies to meet the MUSI goals and their MSRT responsibilities.

GOALS OF THE MILWAUKEE URBAN SYSTEMIC INITIATIVE

The MUSI reform effort has established goals to be achieved over the five-year journey. Each of the five goals are listed below. Following each goal is a brief summary of the actions MSRTs have undertaken during the 1996-97 school year to work toward meeting that goal. Also addressed are areas that will need more attention in the future.

While all goals were confronted by the MSRTs, more focus was given to goals one, two, and four—respectively, establishing a vision; instituting high standards and performance assessments; and developing high-content, inquiry-based, technology-rich curriculum and instruction. Goals three and five—narrowing achievement gaps and breaking boundaries between classrooms and the community, respectively—were also addressed but to a lesser extent.

The MSRTs concentrated their work around the school and classroom communities of learners. The MSRTs devoted much of their time to establishing themselves within their schools and addressing critical and immediate needs. These needs were reflected in the time spent with individual teachers in classrooms, with students, and with school staffs assisting them with their concerns over instruction, assessment, and student achievement.

When looking at what transpired during this first year expedition, it is clear that to reach these broad goals, small but significant steps must be taken over time to establish understanding, cooperation, skills, expectations, and the desire to change among staff at the classroom, school, and district levels.

Establishing ongoing collaborative vision setting.

To establish a district-wide vision of mathematics and science instruction and learning, individual school strengths as well as areas of improvement have been observed and recognized. Observation and documentation have begun as a result of the MSRTs' consistent and regular participation in classrooms, at department and grade level meetings, and in conferences with individual teachers, administrators, and learning coordinators.

MSRTs have been channels for collaboration between MUSI schools in the form of shared inservices, student projects, and visits by teachers to other schools.

As a District Community of Learners, the MSRTs have a finger on the pulse of mathematics and science through their regular, long term commitments to a wide range of committees and activities across the district.

Within some schools, MSRTs have been actively involved in the development of the school effectiveness plans and setting up leadership teams to address mathematics and science issues.

Instituting high standards and performance assessments.

Most MSRTs work on science or mathematics curriculum, standards, and assessment committees at the district level. Policies, benchmarks, standards, and curricula are shared and discussed among MSRTs and then shared with MUSI schools on a school-by-school and teacher-by-teacher basis.

Through the MSRTs, individual teachers as well as administrators have been given opportunities to gain a better understanding of the mathematics and science standards and proficiencies through conferences, inservices, and meetings. Strategies have been developed at the classroom and school levels to meet specific needs.

MSRTs have provided resources to assist teachers and administrators in their understanding of the assessments.

MSRTs have involved some of their school staff members in district-wide holistic scoring and district-wide science and mathematics committees.

Narrowing ethnic, gender, and socioeconomic achievement gaps.

Some MSRTs have met with teachers and administrators to explain and help analyze mathematics and science assessment test results, pointing out the strengths and areas of concern in student achievement.

After looking closely at test results, some MSRTs have assisted schools in developing action plans or various strategies, such as curriculum alignment, for improving instruction and student achievement in mathematics and science.

Although some MSRTs have addressed the issue of gaps in student achievement between gender, racial, and ethnic groups in their schools, this area needs more attention, not only addressing the issue, but assisting schools in formulating concrete plans of action to narrow the gaps.

Developing high-content, inquiry-based, technology-rich curriculum and instruction.

MSRTs have encouraged teachers in movement toward more inquiry-based, high-content instruction through modeling, team teaching, conferencing and reflecting, observing and providing feedback, conducting staff inservices, introducing and assisting with pilot projects or curricula, helping to develop units and lessons, and gathering materials and providing resources.

A few MSRTs have encouraged increased use of technology within their science and mathematics instruction, especially the use of graphing calculators. A few have also assisted teachers with computer software and internet access. Technology-rich curriculum is an area that seems to need more attention in the future.

MSRTs have encouraged staff members to attend the UWM/MUSI courses, and in some cases have attended these classes with the teachers, enabling them to discuss, reflect on what was learned, and support them in trying out teaching strategies in their classrooms. Some MSRTs have also attended various mathematics and science events and opportunities such as conferences and inservices with school staff, providing opportunities and time to discuss and reflect with teachers.

MSRTs have kept teachers informed of up-coming events and opportunities in the areas of science and mathematics.

Breaking boundaries between classrooms and the broader community.

Initial contacts have been made by some MSRTs with business partners and informal education agencies. These contacts indicate that there will be more activity and follow-up next year.

A few MSRTs have attended parent meetings or have been involved with parent coordinators and parent committees. Again, this component of the school community has been only mildly approached regarding mathematics and science reform.

MSRTs have assisted school staffs with writing grant proposals.

DESIGN, PURPOSE, AND RESPONSIBILITIES OF THE MSRTS

Reviewing the challenges and responsibilities of the MSRTs once again, one can recognize and identify how they have responded collectively to this new role within the Milwaukee Public Schools. This cadre of 25 MSRTs has blazed the trail for systemic reform in mathematics and science during this first year of the Milwaukee Urban Systemic Initiative.

The MSRTs were asked to serve as teacher leaders who mobilized school communities to embrace high expectations for all students in mathematics and science, developed effective teaching and learning to achieve those high goals, and served as links to the larger district-wide initiative. Every aspect of the MSRTs work was designed to build capacity for change at the classroom level, the school level, and the district level.

The major duties and responsibilities of the MSRT included:

- Support effective learning in their school communities through a variety of collaborative techniques, including peer coaching, team teaching, demonstrations, and facilitating small- and large-group meetings and workshops.
- Provide school-based leadership in forming a vision of mathematics and science learning which embraces high expectations, standards-based instruction, and commitment to principles of equity among the members of the school community.
- Foster the use of technology, authentic assessments, and community resources in mathematics and science.
- Provide access to current literature, learning activities, and other science and mathematics related resources to members of their school communities.
- Learn through independent study, seminars, study groups, networks, courses, and conferences.
- Promote interconnections among teachers, students, and other community members district-wide around topics related to mathematics, science, and technology.

Throughout their reports, MSRTs described successes and accomplishments that were indications of advancement toward the fulfillment of their responsibilities. They also acknowledged frustrations that hampered their progress and often made them feel less productive than they wished to be. Change did not come easily or swiftly, and expectations had to be altered.

While individual MSRTs have responded in different ways and to different degrees to these challenges, it was evident, through their reports, that all of the listed responsibilities have been initially undertaken by the MSRT cadre as a whole. They have been actively engaged in improving mathematics and science teaching and learning in the classroom community, the school community, the district community, and beyond.

Areas that will need more concentration as the journey continues in the following years include the areas of technology, community resources, and family involvement. As a group, MSRTs demonstrated a wide variety of talents and commitments across the district, the state, and the nation.

To maintain what has been accomplished during this first year of the journey and to push further toward realization of the MUSI goals, MSRTs need to continue all of their efforts, and need to persist, in spite of the speed bumps and road blocks along the way. Accomplishing the vision of increasing, not only in their schools but across the district, a capacity for change will assure greater achievement in mathematics and science by all students in the Milwaukee Public Schools.

The journey has begun.

APPENDIX

FIRST WAVE MUSI SCHOOLS
AND
FIRST COHORT OF MSRTS

FIRST WAVE MUSI SCHOOLS

- Auer Avenue Elementary School
- Bryant Elementary School
- Burroughs Middle School
- Cass School (K–8)
- Clarke Elementary School
- Doerfler Elementary School
- Edison Middle School
- Eighty-First Street Elementary School
- Fernwood School (K–8)
- Fifty-Third Street Elementary School
- Fritsche Middle School
- Garfield Elementary School
- Grand Avenue School
- Grant Elementary School
- Grantosa Elementary School
- Green Bay Elementary School
- Hartford Avenue School (K–8)
- Juneau High School
- Lady Pitts School (Alternative)
- LaFollette Elementary School
- Lavarnway School (Alternative)
- Lincoln Center for the Arts
- Lloyd Street Elementary School
- Malcolm X Middle School
- Martin Luther King, Jr. Elementary School
- Milwaukee School of Languages
- Milwaukee Village School
- Morgandale Elementary School
- NcNair Elementary School
- Neeskara Elementary School
- Parkman Middle School
- Pierce Elementary School
- Pulaski High School
- Rivertrail Elementary School
- Robinson Middle School
- Roosevelt Middle School
- Scott Middle School
- Sherman Elementary School
- Sholes Middle School
- Sixty-Fifth Street Elementary School
- South Division High School
- Starms Discovery Learning Center
- Starms Early Childhood Center
- Steuben Middle School
- Stuart Elementary School
- Thoreau Elementary School
- Urban Waldorf School
- Vincent High School
- Washington High School
- Webster Middle School
- Whitman Elementary School
- Zablocki Elementary School

FIRST COHORT OF MATHEMATICS/SCIENCE RESOURCE TEACHERS

Patricia Barry

Bonnie Edwards

Janis Freckmann

Elizabeth Freeman

LouJane Gatford

Joan Grampp

Kevin Haddon

Joan Jennings

Beverly Kemp

Jeff Kloko

Sue Kowalski

Lee Krueger

Barbara Martinko

Paula McLean

Timothy Miller

Kaye Mitchell

Michael Nagel

Diane Price

William Rawles

Jim Turner

Christine Walczak

Wendy Weiner

Michelle Weisrock

Jim Wojtech

Sharon Zagorski